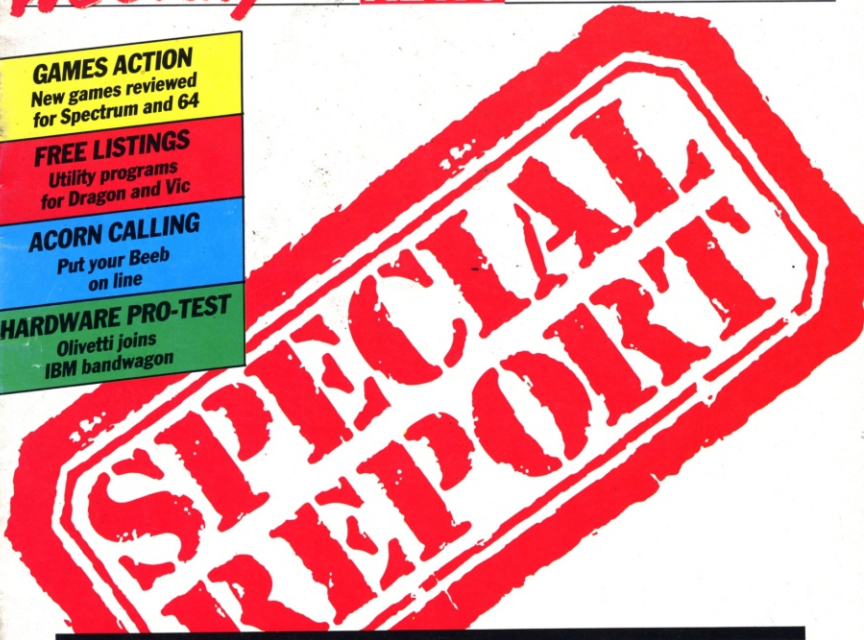
PERSONAL COMPUTER weekly NEWS
AUGUST 4 · 1984 · No 72 50p

GAMES ACTION
New games reviewed for Spectrum and 64

FREE LISTINGS
Utility programs for Dragon and Vic

ACORN CALLING
Put your Beeb on line

HARDWARE PRO-TEST
Olivetti joins IBM bandwagon



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MENU

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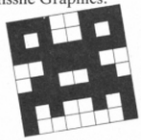

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Competition
Five Commodore 64s must be won

In a touch of summer madness *PCN* is giving away five best-selling Commodore 64s. Last week's issue contained the first three of six questions: turn to page 16 for the second half of the competition and the entry form.

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Sinclair in gear

Sinclair has just upped the stakes in the battle for domination of the UK computer market. As Commodore prepares for the launch of the C16 and Plus/4, and the Japanese gear up for the MSX invasion, Sinclair is cranking up Spectrum production, with the aim of selling £850,000 worth of them this year.

The QL and the flat screen TV are also headed for the shops in September, and the Spectrum Microdrive and Interface 1 are already going out in an enticing new starter pack form.

In preparation for the Christmas rush the company is offering six software titles — *Scrabble, Chequered Flag, Make a Chip, Survival, Horace Goes Skiing* and *Chess* — free with every Spectrum sold, and is also attempting to mend its fences with the retail trade.

The Sinclair Spectrum was in desperately short supply last Christmas, and in the wake of the QL launch this seems to have been carried across well into this year. One dealer was claiming that the allocation for his chain of shops in the period up to Christmas 1984 was one Spectrum per shop per week. Sinclair, however, is now willing to renegotiate allocations, and is increasing production to 200,000 Spectrums a month. The company is quite categorical that anyone who wants a Spectrum during the Christmas period will be able to get one.

Microdrive cartridge production is also up, with a view to cutting the price later in the year. Cartridge availability hasn't been all it might have since the launch of the Microdrive, but the main brake on software production has been the independent software houses which simply can't afford the high entry cost of putting their products on Microdrive. Sinclair is trying to get round this by throwing in *Ant Attack, Tasword 2, Masterfile* and *Games Designer* on cartridge when you buy a Microdrive and Interface 1.

In addition to this, Sinclair is pulling out of mail order sales for established products. Mail order is now being seen as a way of generating demand for the product — in spades in the case of the QL — so it will in future be used only for new products, to be followed up rapidly with the retail launch.

As far as the QL is concerned mail orders are estimated at between 15-20,000 in total, and these will be cleared by the beginning of August. The figure of 15,000 is on the low side compared to initial projections, and is only 1,000 above the figure Sir Clive himself gave *PCN* some six weeks ago. A Sinclair spokesman said however that cancellations of QL orders had been minimal, certainly 'much much less than five per cent', and that the decline had been a consequence of the company pulling out of advertising in the wake of heavy demand. But the poor press reception the machine has received recently may also be a factor.

The QL should be much easier to get hold of in the next few months. Production levels are scheduled at 50,000 a month, and letters are currently going out to mail order buyers of the Spectrum (presumably a final fling) offering delivery of a QL in two weeks.

Interpod home

By David Guest

Users of Oxford Computer Systems' Interpod can count on continued support as Parc Electronics, manufacturer of the Interpod for OCS, takes the product completely under its wing.

OCS ceased trading a month ago and rumours were circulating last week that a rescue bid was in prospect. But the uncertainty for Interpod users is over, and OCS is left with the purely soft products for which it is best known.

Parc's financial director Lawrence Lewis pledged support to users and said: 'Initially we're trying to clear the stock (about 2,000 finished units) but if the product takes off we're in a position to build larger quantities.' Parc intends to slash the price from £99 to less than £60, and already has potential orders.

The company has been one of the UK's largest sub-contract manufacturers but it has also acquired a marketing arm in the last few weeks by buying Cheetahsoft, which Mr Lewis said will continue to trade as an autonomous unit.

DR joins video revolution

Systems software specialist Digital Research has joined the video revolution with a link between a Commodore 64 and a videodisk player.

Its VidLink is an intelligent cable which lets you call up and use visual data from a Pioneer LD-700 Laser-Disk machine. DR breathlessly promises: 'The possibilities are limited only by your imagination'.

The price of a videodisk player might be another limiting factor but VidLink itself, on sale in the US at the moment, costs only $49. The development project has been the pet of DR founder Gary Killdall, and coincidentally it mirrors a similar plan under development at Acorn (see page 3).

The latest news of Acorn's venture is that the company has set up a separate unit to develop its interface and cabling. It expects to sell a complete system (BBC micro, videodisk player, processor and software) for £2,500 or more next year.

Pan claim shocks Oric

By John Lettice

Oric is this week threatened with court action by one of its creditors.

Pan Books is owed £100,000-£120,000 by Oric mainly in payment for the production of the Oric Atmos manual, and intends to serve Oric with a writ if the micro manufacturer hasn't come up with proposals for payment by the end of this week.

Pan talked to Oric finance director Allan Castle about arrangements for payment some two weeks ago, and says that Mr Castle then claimed that Oric owed £2 million to 12 major suppliers.

When *PCN* spoke to him Mr Castle expressed suprise that Pan had a writ waiting in the wings, although he conceded that the debt position would be broadly correct. Oric, he said generally owed 25 suppliers some £2.5 million at the end of any given month. In addition to this the company was ploughing money into production for the Christmas rush, and this time of year is usually 'tough on cash flow'.

As far as Mr Castle was concerned Pan was expecting to hear from Oric by Monday of this week. 'Pan have been kind enough to allow us more credit than one would normally expect,' he said, but Oric would be paying the money shortly. He also stressed that Oric's current position was by no means unusual in the micro business.

The debt to Pan stems from a joint venture between Pan Books and *PCN*'s publisher, VNU Business Publications. This produced the Pan-*PCN* range of books, although there is no editorial connection between *PCN* and *PCN*-Pan.

Microsoft coins Word 1.1

Microsoft is producing an upgraded version of its word processing package, Word.

Word version 1.1 offers a number of additional facilities, the main improvement being full mailmerge facilities. Other additions are the capability to support the Hercules Graphics card, giving a 90 column by 43 line screen, and support for almost every major printer on the market.

Prism broadens base

By Ralph Bancroft

Prism, the micro products distributor, is branching out in new directions following a cash-raising operation that has put £1.2 million into the company.

Prism has raised the money from three City institutions in exchange for a ten per cent stake in the company.

Richard Hease, Prism's chairman, said that the money will be used to finance expansion into business computers, viewdata, conventional publishing and 'innovative domestic electronic equipment'. But while expanding in new areas, Prism may well contract in at least one other.

Greens has sacked Prism as its supplier of cassette software and is currently negotiating with rival distributor Websters Software. Prism is one of the major software distributors offering high street shops a merchandising system that aims to keep them supplied with the latest top-selling games.

Mr Hease said he doubted whether there was much of a future in distributing software on cassette. 'We are seriously considering whether to continue in software merchandising,' he said. The company will, however, continue with its software wholesaling activities.

Greens fell out with Prism because it failed to keep them supplied with the latest releases.

'It gave a good service but just didn't have the stock,' said Les Knight, until recently micro manager at Greens which was formerly Prism's major client accounting for over 50 per cent of Prism's sales.

Mr Hease denied that the money raised by the private placement of shares would be used to ease cash flow problems. 'We are in an exceptionally healthy cash position,' he said.

Prism: winding up its cassettes?

Curry expands on Acorn

By Cyndy Miles

Buoyed up by the renewal of the BBC contract (issue 70) Acorn is pushing ahead with plans to change the face of home computing.

In an exclusive interview Chris Curry, Acorn's managing director, talked about the company's intention to put home micros to work to break new ground in home entertainment, and to press ahead with other developments on the home and business fronts.

Early next year it will be producing a control device which, when plugged into the telephone line and connected to the mains, will put home systems and domestic appliances under remote control and keep home status reports on screen.

Home shopping, banking and electronic publishing will become part of the system and eventually, he suggests, manufacturers of such things as washing machines and televisions will build these control devices into their models.

Electron: add-ons 'thick and fast'.

Electron add-ons will come 'thick and fast' in the run up to Christmas, according to Chris Curry.

These include Econet and disk drive interfaces to supplement those already available to connect printer and joystick, as well as a new home control device.

And Mr Curry gave his assurance that Electrons would be in full supply this Christmas. Last year insufficient supplies of the machine's ULA caused chronic shortages.

Now he says Acorn is selling about 25,000 Electrons a month worldwide and is 'prepared to make 100,000 for Christmas to be sure of meeting demand.'

But don't buy one in the hope of upgrading to the BBC in easy-to-afford stages. 'I never promised that the Electron would be upgradable to the BBC and it was never intended that it should be,' said Mr Curry.

This move into more practical home use reflects Mr Curry's major concern about the developing computer industry.

'Stories about computers being a passing craze must be proved wrong,' he said. 'It is time now to start showing where they can perform tasks . . . they will only become an essential part of the home if they do practical things.'

Mr Curry also revealed why the BBC was so willing to extend the contract for a further four years plus an additional two-year option.

The attraction to be launched in April next year is Acorn's interactive video scheme. The hardware interface and the control language it uses should be available this autumn for people helping to develop the system.

It's a scheme which Mr Curry describes as a major priority both for his company and for BBC Television.

'We expect to work very closely with the BBC and with others for the development of interactive video material both for entertainment and for education.'

The system will link the computer to video disks. It involves optical storage disks as developed by Philips and Pioneer, though more advanced R and D take this system to a 'much grander scheme.'

But he declined to go into detail. Computer manufacturers have all been told off for pre-announcing their products, he said: 'Our connection with the BBC has made us particularly sensitive . . . we are trying to be very good now.'

Perhaps that is why we've had only trickles of information about Acorn's business machine, due in October.

The latest from Mr Curry is that the range will start at around £800 with a single disk, single processor version with word processing software and integral monochrome monitor, to the hard disk model with the 16032 (now renamed the 32016 by the manufacturer) chip for about £3,000.

There will be access through a modem to the Econet local area network and a choice of second processors to enable people to choose their own configuration.

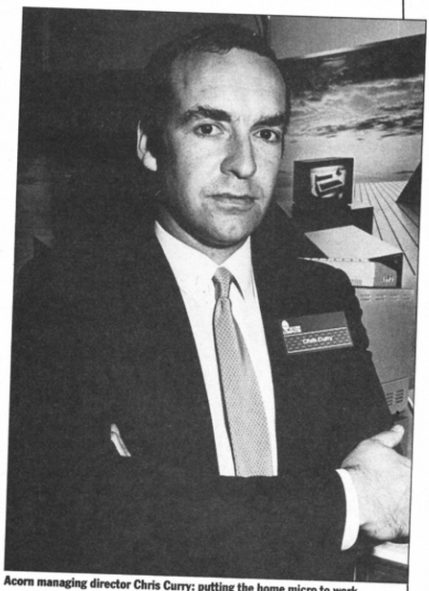
Compatibility will, of course, be maintained and the 32016 will be launched as a second processor for the BBC at the end of the year, coming out in its own ABM model about two months later.

'The aim is to get the 32016 with a substantial chunk of memory for under £1,000 as an add on,' he said.

He admitted that chip manufacturer National Semiconductor had problems developing the 32016 and that even now it was not yet running at full speed in test units at Acorn's offices.

'But we are entirely satisfied that the 32016 is on and that we will get fully operational parts for full production around the new year.'

But there is no BBC model C to look forward to. Mr Curry denied its existence, even in medium term plans. Instead the extras will keep coming.



Acorn managing director Chris Curry: putting the home micro to work.

'We have working versions of the 68000, 8086, 81286 and 32016, and whichever is gaining pre-eminence we will bring out as a second processor for the BBC.' This will supplement the existing Z80 and 6502 processors.

'If IBM compatibility is a really major thing, which I think it is, then the 81286 will certainly be available, and that is how we will do it. That is how we always intended to do it.'

Then there is Torch. Contrary to popular belief, it is not yet owned by Acorn and will be only if business targets are met in the next year. Even so, the arrangement gives Acorn linked but autonomous product development where Torch will produce 'what you wouldn't expect from Acorn'.

Asked whether he feared Acorn being seen as staid and less daring than, say, Sinclair Research, Mr Curry replied: 'I don't mind people having the impression we have become solid and reliable.

'We have no intention of being left behind. We have every intention of staying in front, even though the main machine that is seen by everbody as our state of the art has been around for two and half years. 'One of the manias in our R and D is making things go fast . . . speed is power and any of the bits and pieces we produce will usually outperform the competition. Our IBM-type product will certainly run faster than anything IBM can produce.'

If British manufacturers worked together to produce a standard interface for home machines, few people would buy the Japanese MSX micro standard, says Acorn's founder Chris Curry.

'One way to stop the growing interest in MSX is to make sure there is a level of compatibility between products.

'There are a fair number of Spectrums in schools and it would help if they were able to communicate with a network of BBCs,' he said.

In this way money wouldn't be wasted on buying MSX — what he calls a 'doomed and out-of-date system'.

But co-operation may not be easy among Britain's rival companies. Mr Curry says he has already suggested Sir Clive Sinclair puts BBC Basic on to his machines, but received little response.

VIEW FROM AMERICA

The family house that Jack built

By Chris Rowley

As you might expect the microcomputer scene is avidly wondering what Jack Tramiel will do next. Nowhere is there more concern on this topic than within Commdore, which Jack built and left this February.

One question now answered concerns what Tramiel was up to from February until July — he was travelling extensively in the Far East, setting up manufacturing facilities and recruiting investors for his new company Tramiel Technology Inc for which he raised about $75 million. He then picked up the stricken Atari for a song and is back in the US micro battle.

What motivates the man? Inside Commodore itself they well remember Jack's approach to business — it is also felt that Jack is a man for whom revenge has a very strong meaning. One analyst observed that 'Jack will go after them with both guns blazing'.

Indeed speculation about the reasons for Tramiel's resignation from Commodore was fuelled by his appointing three of his sons to top posts in the new Atari. Sam Tramiel is now president, Leonard Tramiel is in charge of boosting software development, and Gary Tramiel is out chasing unpaid debts to Atari.

Is it possible that Tramiel left Commodore because Irving Gould refused to let Jack advance his sons in the way he wanted to?

We should note at this point that Commodore, while selling 300,000 64s in June alone, is cutting back on new product development. Four chief engineers have just left to go to Atari, and they may well have taken with them the planned Commodore business machine based on the 32-bit Z8000 chip. Certainly Commodore is suing the defectors for theft of company secrets although Tramiel wasn't named in the suit.

In addition there is said to be considerable unease within Commodore about the new Plus/4 personal computer. So where might Jack choose to go in 'with both guns blazing'? Several possibilities have been suggested.

One . . . at the bottom of the market: Jack's favourite killing ground where he bled Texas Instruments, Mattel, and Atari white last year. However, Commodore probably has room to cut the price of the 64 and still make money, and though Tramiel might drop the Atari 800XL to $200 for Christmas the 64 could go down to $150 or less.

Two . . . he might adopt a powerful proprietary chip and use it as the basis of a Mac-style high performance business computer for $1,000.

Three . . . or he could aim to bluff the whole market and get in behind them. The era of the 256K RAM chip has dawned; Fujitsu and Hitachi have notched up 15 million unit sales already. In June Intel announced a CMOS 256K RAM. The rush is on to get a piece of the mega-RAM market. Might Tramiel try to trump Apple's 'Fat Mac'? The 512K model is planned by Apple to appear in early 1985, but if he goes for a 1Mb home computer at around $1,000 it could look very slim (256K RAMs currently cost $150 each to manufacturers).

Or could it be that Jack has even more direct ideas? On Wall Street there has been speculation that Tramiel will simply hammer Commodore so hard in the next year with cheap Atari products that in the end he'll bring off a leveraged buy-out of Commodore, get rid of Irving Gould and re-install himself and his sons at the helm of a united Atari/Commodore that will completely dominate the low end of the market.

You will be glad to know that you too can join the speculative frenzy by acquiring Mind Prober, a new piece of so-called 'expert software' from Human Edge of Palo Alto. Load Mind Prober into your 64, Apple II or IBM PC, and then start building up a psychological database on Mr Tramiel, or your lover, or head teacher or office rival. With Mind Prober to sift through their personality traits you'll soon be able to unlock their hidden motives, deepest desires, and most secret fantasies. The advertising slogan that goes with Mind Prober is: 'Orwell said it would happen and now it has.'

What are the odds that Irving Gould has Mind Prober up and running right now in his office at Commodore?

Mastertronic in acquisition

Pocket money software pioneer Mastertronic is on the acquisition trail, following its purchase of the rights to games produced by the now defunct Carnell Software.

The company refused to confirm or deny that it has also put in a bid for parts of another recent casualty, Rabbit Software (issue 70).

Mastertronic has set up a new joint venture with ex-Carnell programmers Roy Carnell, Stephen Kirk and Stuart Galloway to market Carnell's games. The new company was going to be called Innovision but found it was unable to register the name. A new name has yet to be chosen.

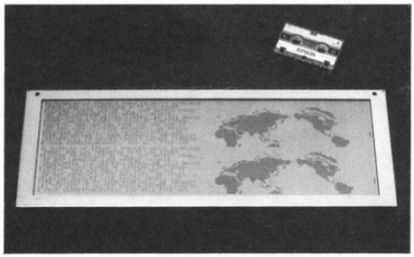
It is planning to convert Carnell's adventures to run on the Commodore 64 in time for the autumn sales season.

In the meantime, the two existing Spectrum titles, *Black Crystal* and *Volcanic Dungeon*, will continue to be available at £7.50 and £5.95 respectively.

The new game that Carnell was working on, *Wrath of Magra*, is due to be launched as soon as marketing arrangements are finalised. The game comes complete with glossy book and will sell for £12.50.

Commenting on Rabbit, Martin Alper, Mastertronic's managing director, said that any conversations with a receiver/manager were confidential. However, *PCN* has been reliably informed that less than 24 hours after the liquidator went into Rabbit, Heather Lamont, a Rabbit director, put in a bid of £40,000 from Mastertronic for various assets.

'You could say that we are very much on the acquisition trail,' said Mr Alper. 'We are always on the look-out for talent and you can expect Mastertronic to get involved in other new ventures in the future.'



LIGHT CRYSTAL — Scooped slightly by ACT's launch of the portable Apricot (issue 68), Epson has announced 'the world's first 25-line liquid crystal display' (LCD). A spokeswoman explained that the Epson display was launched 'some time ago' in Japan, and hence beat the ACT device, but ACT is going to be first to have such a screen on a commercially available machine. The Epson unit is seen by the company as a product for system-builders to use, and it has no plans itself to use it in an Epson system. Production quantiites should be in full swing by winter.

Companies seek legislation against software pirates

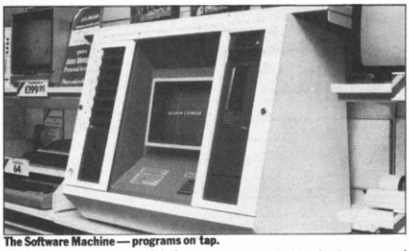
On the trail of the commercial software pirate Nicholas Lyell MP last week introduced a Bill under the Ten Minute Rule.

The Bill seeks to amend the 1956 Copyright Act to cover software producers and provide the police and the courts with greater search powers and much harsher penalties. Supported by Fast (the Federation Against Software Theft), the Bill establishes beyond all doubt that software is protected by copyright law.

All the parties involved admit that this Bill stands virtually no chance of going through. What it does do is provide a starting point for a Private Member's Bill at the end of the current session. The basic idea of the Bill has support from all the major Parliamentary parties and Kenneth Baker, the Conservative industry spokesman, has intimated that the Government will give full support to such a Bill, if anyone takes it up.

In the meantime, Fast will be getting its members to lobby various MPs in the hope of persuading them to either take up the Bill, or at least turn up to vote for it.

Expresso software



The Software Machine — programs on tap.

The shop-keeper's mournful 'Sorry, out of stock' could be a thing of the past for software buyers as Program Express start to install its Software Machine in shops around the country.

The system isn't the first attempt at the electronic distribution of software but the Software Machine is unusual in dealing out software on cassette — most other systems are restricted to cartridges.

The Software Machine, built by Inventory Transfer System in California, is essentially a software library that can download programs on to tape, diskette of cartridges. Its 40Mb hard disk can hold about 1,200 titles.

For retailers it has the advantages of cutting their inventory costs and making sure they're never out of stock, except in the titles they don't carry anyway. Program Express also promises to keep its customers regularly updated with new titles, and the software distributor Micro Dealer UK has been appointed to help in this and in the selection of the range of supported titles.

But it isn't likely to reduce prices — your main benefit should be in the availability of software, as long as the software suppliers themselves can be persuaded to back the scheme.

The first systems will arrive in October, and 60 will be installed for a controlled trial period. The John Menzies chain has already said that it will use them, and other multiples are expected to follow suit.

■ Prism's involvement with a downloading system built by Romex is 'in abeyance for an indefinite period'. The company found that software houses weren't sufficiently interested; but then the Romox equipment doesn't download to cassette.

Scots PCW show: the Enterprise that boldly goes where others dare not follow

By Sandy Coutts

A pre-production model of the long-awaited Enterprise computer made its appearance at the Scottish *PCW* show in Edinburgh.

The born-again Elan is now due to go on sale in October, Steve Groves of Enterprise told visitors. A deal has been struck with the John Menzies chain of stores and the 64K model will cost £229.95.

The appearance of the machine on show — it looks as if a road roller has squashed it — will not change but final touches are being put to the electronics.

Groves said that several of the leading software houses would be producing programs and that a £20 million production deal has been signed with Welwyn Electronics of Northumberland to produce 20,000 computers per month.

The show itself held few surprises. None of the leading home computer makers made it north of the border. The software houses were represented by CDS and Longmans. CDS is planning a batch of about nine new releases, and will support the Amstrad and MSX machines.

It was really left to Edinburgh University — one of the leading centres of artificial intelligence research — and user groups and clubs to provide interest.

GEC Dragon was due to have been there, but had not appeared for the trade and press day opening.

Dragon's future has still not been secured as talks continue.

Robyn rebate

Olde Worlde charm is alive and well in, or near, Sherwood Forest.

In issue 71 on the Software Pre-view page we inadvertently gave £7.50 as the price of Runesoft's Spectrum adventure game, *Robyn Hode*. This should have been £9.95, but the company tells us it is prepared to take the unprecedented and amazingly generous step of selling the game at £7.50 to any *PCN* reader who sends it the table — no photocopies please.

Runesoft is at Charnwood House, 67 Lower Parliament Street, Nottingham NG1 3BB.

PERIPHERALS

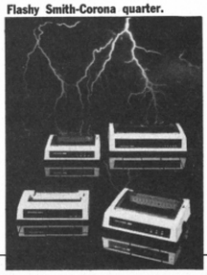
The new releases

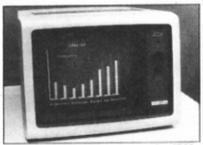
Fujitsu printer via Aptec.

Printers: Besides word processors and micros Olivetti also builds peripherals for personal computer users, and it has just launched three new models to run off such systems as the PC, DEC Rainbow, and ACT machines. The DY 250 and DY 450 are both daisywheel devices, the 450 managing 45 cps and costing £999. The third new model is the dot-matrix DM 580. Appropriate Technology (01-328 7272) has enhanced two Fujitsu serial printers, the dot-matrix DPL 24 by adding IBM-compatibility and the daisy-wheel SP 320 by accommodating Qume and Diablo print wheels. Smith Corona is relaunching its range of printers under the wing of a new division, SCM Data Products (01-900 1222); the units are the £299 L1000 daisy-wheel and the dot-matrix devices Fastext 80, D100, D200, and D300 at £195, £249, £420 and £550 respectively.

Monitors: Risking confusion with an Epson micro, Interquadram (06286 63865) has launched the HX-12, a high resolution colour monitor for IBM PC users. The definition is 690 by 240, the price

Flashy Smith-Corona quarter.



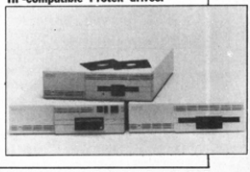


Interquadram — colour on the IBM.

£494. The company has also announced the monochrome Max-12, for £186. Sanyo (Watford 46363) has introduced the CRT36 and CRT70 to go with its MBC-550 and 555 micros. The 36, for £146, is a 640 by 200 monochrome monitor; the 70, with the same resolution but also colour, costs £573.85.

Storage: End users can now buy Kennedy hard disk subsystems previously only sold to systems builders by Sintrom Electronics (0734 875464). The 4055 and 8055 offer 40Mb and 80Mb respectively. Both models have a data transfer rate of 1,209K bytes/second. Apple IIe and II+ users can hook in 2Mb of floppy storage in Eicon Research's (0954 81825) Tera-drive, a dual 5¼-in configuration that costs £1,050. For Hewlett-Packard owners Protek (01-245 6844) has added eight Winchester disk subsystems to its range, which now starts at a 5Mb system for £2,000 and rises to 45Mb with an 8in floppy for £5,500. They are compatible with the series 80, Series 100 and Series 200 machines. An on-line 20Mb cartridge disk system for the IBM PC and XT has been launched by Micro Technology (0892 45433). Called the Honeycomb, the system has two removable 10Mb disks; it costs £3,450 and cartridges cost £65 each.

HP-compatible Protek drives.



PCN CHARTS

GAMES

NEW WEEKLY CHART! NEW WEEKLY CHART

			GAME TITLE	PUBLISHER	MACHINE	PRICE
▶	1	1	Sabre Wulf	Ultimate	SP	£9.95
▲	2	3	Match Point	Psion	SP	£7.95
▼	3	2	TLL	Vortex	SP	£5.95
▲	4	5	Valhalla	Legend	SP, C64	£14.95
▼	5	4	Lords of Midnight	Beyond	SP	£9.95
▲	6	7	Beach-head	US Gold	C64	£9.95
▲	7	10	Arabian Nights	Interceptor	C64	£7.00
▲	8	9	Mugsy	Melbourne	SP	£6.95
▼	9	8	War of the Worlds	CRL	SP	£5.95
▲	10	14	Jet Set Willy	Soft Projects	SP	£5.95
▲	11	12	Hulk	Adventure International	SP, C64, AC, AT	£9.95
▼	12	11	Psytron	Beyond	SP	£7.95
▲	13	30	Trashman	New Generation	SP,C64	£5.95
▼	14	13	Jack & B'Stalk	Thor	SP	£5.95
▲	15	17	Loco	Alligata	C64	£7.95
▼	16	6	Fighter Pilot	Digital	SP	£7.95
▲	17	19	Stop the Express	Psion	SP	£5.95
▼	18	15	Beaky & Egg Snatchers	Fantasy	SP	£6.50
▲	19	20	Frak!	Aardvark	AC	£7.50
▼	20	16	Cavelon	Ocean	SP,C64	£5.90
▲	21	23	Antics	BugByte	SP	£6.95
▼	22	18	Encounter	Novagen	C64, Atari	£8.95
▲	23	—	737 Flight Path	Anirog	Vic, C64	£7.00
▲	24	28	World Cup	Artic	SP	£6.95
▲	25	27	Full Throttle	Micromega	SP	£6.95
▼	26	22	Football Manager	Addictive	SP, AC, C64	£6.95
▼	27	21	Kosmic Kanga	Micromania	SP	£5.95
▼	28	25	Son of Blagger	Alligata	C64	£7.95
▲	29	—	Chukkie Egg	A&F	SP, C64, AC, DR	£7.90
▲	30	—	Micro Olympics	Database	SP, C64, AC	£6.95

MICROS

Top Ten over £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▶1	1	IBMPC	£2,390	IBM
▲2	5	Apricot	£1,760	ACT
▼3	2	Apple III	£2,755	Apple
▼4	3	Sirius	£2,525	ACT
▲5	6	Televideo-TS1603	£2,640	TH
▼6	4	DEC Rainbow	£2,359	DEC
▲7	—	Compaq	£1,960	Compaq
▶8	8	Wang Professional	£3,076	Wang
▶9	9	Philips P2000 c	£1,484	MD,KDS
▲10	—	LSI Octopus	£1,760	LSI

Top Ten up to £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▶1	1	Spectrum	£99	Sinclair
▶2	2	CBM 64	£199	CBM
▲3	4	Electron	£199	Acorn
▼4	3	Vic 20	£145	CBM
▲5	6	BBC B	£399	Acorn
▼6	5	Oric Atmos	£175	Oric
▶7	7	Memotech 500	£275	MTX
▲8	9	Atari 800XL	£250	Atari
▲9	10	Oric	£99	Oric
▼10	8	Dragon	£150	Dragon

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to **July 25.** The games chart is updated every week.
Neither mail order nor deposit-only orders are included in these listings. The prices quoted are for the no-frills models and include VAT.
Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month.
PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

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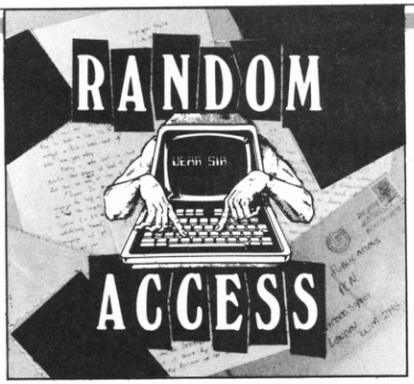

Would you like to see your name in print? Here is your chance on *PCN*'s letters page.

Oric owners are fortunate

I am writing with reference to P Marston's letter (issue 68). I bought an Atari for £400. You can now buy one for £150. While my computer was still under warranty, Atari introduced two 'new' home computers, both the same as the old machines apart from a new casing and a couple of minor changes in the ROM.

PCN £10 Star Letter

I don't think Atari, a multi-national company, is going to exchange my Atari 800 for an Atari 800 XL. Why should Oric (which is not in the fortunate position of having enormous financial backing as Atari) replace old Orics for almost exactly the same computer.

I think P Marston should be happy that because there are few differences in the machines, software houses will probably write programs for both machines.

Simon Watson,
Cookham, Berks.

Prestel — BT is merely 'ticking over'

I disagree that BT underestimates the power and sheer number of the ever-increasing number of home computer owners (Paul Connolly, issue 67). As BT is among the leaders of communication technology, I'm sure it is well aware of it.

If due consideration is given to the way the system operates as a whole, then sound commonsense and a regard for existing users is the principle behind BT's quietly, quietly approach. The telephone lines which can link you to the Prestel computers were designed many years ago, without a single thought that they may eventually have to carry computer data. Also, if everyone were suddenly to open a subscription, there would no doubt be many, many complaints about the various Prestel computers always being engaged. There must be a limit to the number of lines into the computers, and a too many users for too few lines situation could easily result from a mass publicity exercise. I'm sure BT has put a lot of thought into the launching of Prestel to the home computer user, and is merely 'ticking over' and waiting until the system is ready to handle the sheer numbers involved in the home computer market before launching it wholesale.

As a Prestel user for some time now, I cannot see how any home computer user can be without it. With regard to expense, I buy telephone stamps and tailor my use of the telephone to suit the amount of stamps I have bought. The cost to me is Prestel subscription, £13 per quarter and use of telephone, £32 per quarter, which works out at 54.5p a day. I use Prestel every day, and I also use the telephone to access the many bulletin boards around the country.

Squid Gilmour,
London NW6.

Some Crystal clear points on Einstein

Congratulations on a superb article and excellent colour photographs on the Einstein Theory (issue 70). As co-designers and writers of the disk operating system and Basic for the machine we humbly beg to make small corrections.

The machine reviewed was not a production machine, nor were the manuals production manuals. This would explain some of the minor discrepancies between the article and the machine released to the public.

The RS232 port is capable of being programmed to go as low as, or lower than 45 baud and was specifically designed to cater for viewdata and similar systems as the transmit and receive clocks are different. One of the Einstein's design criteria was that it could be used as a multi-purpose terminal to any mainframe, online data transmission system.

We suggest it was not so much brave of Tatung to use XTALDOS, but simply wise for the following reasons: it is British, supported and designed in the UK, and it is not affected by fluctuating dollar prices.

We would most strongly take to task the comment, 'not choosing an established product (Basic)'. Xtal Basic has been established for five years, is used by a multitude of departments of HM Government, NATO, the US Government as well as many hundreds of companies in the UK and abroad. It is often not recognised by its name, hence the confusion.

In the second from last paragraph, we suspect that a comparison is being made with a well known *Sir*'s machine; we would like to point out that the concept for a Basic language was laid down long before that particular person knew what a computer was.

T Brownen, Crystal Research,
Torquay, Devon.

Oric owner not to be outdone

If you think the treatment received by C Edwards (issue 64) was bad, let me tell you it isn't a patch on my dealings with Oric Products International . . . read on.

On November 25 I sent off my cheque for £100, requesting a 16K Oric 1, the delivery time being stated as 28 days.

The kit had not arrived by March and I had by then realised the restrictions of a 16K machine, so I sent a further £70 on March 12, updating my order to the 48K model.

While I was waiting for my Oric, I discovered that Oric was sending out 48K machines to people who ordered the 16K models, with an option to buy these 'loaned' machines at a much reduced price.

By this time, after being told on numerous occasions, 'Give it another week . . .', I was seeing the very machines in high street shops, some shops (and eventually Oric) giving away free software and selling the machine at a lower price. The only reason I didn't cancel my order and buy from a retailer was that a free Forth package was promised if you obtained your computer through mail order.

I finally received this 'real computer system' on June 7, 194 days after I ordered it (ridiculous), I discovered that the Basic was full of bugs, but I decided to be grateful for what I eventually got.

Was the promised Forth package included? No, it arrived on July 22.

As if I hadn't had enough hassle, the computer finally packed in, and I returned it to Oric on April 19 receiving a replacement on May 4.

And now, yes you guessed it, the infernal machine has again broken down. I have sent the computer back to Oric along with a copy of this letter, requesting a full refund or perhaps an Atmos. Do you think I'll get what I want? No, I didn't think you would.

R Willis,
Cardiff.

Buying adventures here be dragons

How many times have you payed a large amount of money for a game only to find it is rubbish?

Much has been written lately on the subject of misleading cassette packaging and advertisements, *ie* a game can have an exciting inlay card or advertising, but the game is nothing like the fancy pictures and exciting description.

There does seem to be a perfectly logical answer — to print a screen shot of the game on the pack, and also in any adverts for that game. But wait a moment . . . What about that stalwart of computer games playing — the text adventure?

When you consider an adventure game can easily have up to and above 2000 different 'screens' it would be a daunting task to try and represent them on a wall, let alone a tiny cassette inlay or A4 advert. So, what other methods are there of displaying just how marvellous a piece of software is?

Well, the artist must surely be able, with imaginative skills, to give a good idea of the game. But has the artist ever played it, or merely been commissioned to do a final drawing from vague ideas outlined by the software house?

The art aside, the player must turn to the written description of the game. But who wrote the description? The author or the software house? Surely only the author could give an honest representation. But have the programming skills done justice to the author's ideas? And wouldn't the description be biased?

I don't know what the solution is, but it would be interesting to hear what other readers think . . .

Simon Clarke, President of The International Adventure Club, Harpenden, Herts.

WRITE TO: Random Access, *Personal Computer News*, VNU, Evelyn House, 62 Oxford Street, London W1A 2HG.

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Random moves for ZX Spectrum

Q I recently purchased a ZX Spectrum and having ploughed through the manual and a few introductory books settled down to practice by writing a few simple games in Basic. Two problems emerged while setting up these games and I've been unable to discover a solution to either. The problems are as follows:

- **Setting up a random but not too random movement pattern for UDGs, especially in a maze where ATTR is used to define boundaries.**
- **The problem of wipe-out, when one UDG, *eg* a spaceship, passes over a pixel/star, it deletes it from the screen.**

Try as I might, I've been unable to come up with a concise working solution to either problem. Any suggestions?
K Savage,
London SW5.

A The first problem is fairly easy to solve once it clicks into place. Whether you use ATTR or not shouldn't really affect how you tackle it, as you're really asking about movement rather than collision detection. Now when you say 'random but not too random' you're guilty of woolly thinking.

It's either random or it isn't, but we can see what you're getting at. Say you've got four ghosts chasing Horace, Pacman or whatever. These should blunder about, but should have some sort of overriding vector movement that draws them slowly but surely towards their victim.

So you govern their movements at random, but you include a vector that 'loads' the randomness so they move on average in the right direction. Now say the ghost's coordinates are xx,yy and the victim's coordinates are x,y. If xx is greater than x, *ie* further along the screen, you want to reduce xx, on balance. The expression xx>x will return the value 1 if it is true, and 0 if not, so you could attach AND (xx>x) to your randomisation of the x coordinate, or you could do it arithmetically by using +(xx>x) in the calculation.

Incidentally, if you're using mazes it's a lot easier to DIM a$(x,y) where x and y are the number of rows and columns taken up by the maze. Then you just keep a block graphic representation of what you see on screen in the array and, whenever you move a character, check the contents of the array to see if it's hit anything.

Your second problem is similar. As the Spectrum doesn't have sprites you have to store what's on screen in an array, and update the screen from the array at regular intervals. This will slow it down a lot, so if the stars are of no consequence apart from decoration you might be better off adding a routine to replenish them every now and again. Otherwise you'd best get into machine code.

Break-in on games software

Q I bought a new magazine that is on tape to see what it was like. Anyway this magazine gives software reviews just as in *PCN* but it also gives an example of the screen.

What I would like to know is how the BEEP they do it. How do they manage to copy the screen in play when there is usually a break disable in the games?
Colin Merry,
Edinburgh.

A Your trusting and law-abiding nature is highly commendable. Yes, there are various break-disabling and general protection devices built into most commercial games, but no, that doesn't mean you can't break into them.

In the case of tape magazines the answer is fairly obvious — if a company is going to advertise its game with a static frame on such a magazine then, as it knows that protection is built into the game, it's in the perfect position to freeze a frame from the game.

Of course if you're not in this happy position it's all a little more difficult, but if a protection method can be programmed it can be unprogrammed. As far as the software house is concerned, the important thing is to make it exceedingly difficult rather than impossible to break into a program. Statistically practically impossible is usually the best they can do.

Addressing Maplin for a modem

Q After reading Micropaedia (April 7) I was interested in the Maplin modem. Could you please let me have Maplin's address so that I can write for further information?
G Querry,
S Yorks

A You can get in touch with Maplin on Southend (0702) 552911. The company also has shops in London, Manchester, Birmingham, Southampton and Westcliff-on-Sea.

Programming for the Oric: what goes up must come down. . .

Q I own an Oric and cannot work out how to move a character vertically up and down the screen. Can you help?
B Silver,
New Ash Green, Kent.

A Moving a character up and down the screen is quite easy. Think how you'd do it in Basic. You might use a variable to store the absolute screen address of the character (though you could store it as row and column in two variables). Then, whether moving the character up or down the screen, you'd POKE that location with 32 (decimal). 32 is the ASCII code for a space, so blanks out the previous character. To move the character up the screen, you'd subtract 40 from the variable (there are 40 columns per row), while to move down you'd add 40. Of course, you'd have to add in some error trapping, so the character doesn't go wandering off through RAM and corrupt the system variables or the program that's controlling it.

In machine code you need to use a two-byte location to store the character's screen address in RAM. You need a sixteen bit value because the screen starts at 48000 and ends at 49119 (TEXT resolution), and the largest number you can store in a single byte is 255. You could store the information anywhere in RAM, but one useful place is what's called the 'zero page', which comprises RAM addresses from 0 to 255. It's useful because the 6502 has a number of special instructions for handling data there.

The exact form of the assembler code will depend on the assembler you're using, but to move the character down the screen you might use a fragment of code as shown below (NB it doesn't clear the character). The semi-colon is used as REM is in Basic and you should store the routines you use on page 4, ie from #400, as this is reserved for machine code routines. The first part of your routine should take the low byte of the starting address of the character and store it in address 0, the high byte should be stored in address 01.

```
LDA #00  ;load accumulator from address zero
PHA      ;push value in accumulator onto stack
LDA #1   ;load accumulator from address one
PHA      ;push value onto stack
CLC      ;clear carry flag
LDA 0    ;load accumulator with low byte of address
ADC #28  ;and add decimal 40
STA 0    ;store new low byte at address zero
BCS OV   ;branch to routine OV if carry flag set
LDA #(hex of ASCII code of character)
LDY #0   ;load Y register with zero
STA (0),Y;store value in accumulator in two byte address
         given by 0 and 01
PLA      ;pull A from stack
STA 01   ;store A in address one
PLA      ;pull A from stack
STA 00   ;store A in zero
RTS      ;return to calling routine
.OV      ;routine to handle overflow in low byte
INC (1)  ;increase value in address one by 1
RTS      ;return to calling routine
```

MICROWAVES

More hints and tips from our readers to make programming a little easier.

You all know the feeling: after hours, days or even weeks spent on a particular problem you suddenly see the answer. Or on one of those late-night expeditions through the memory map you find some undiscovered feature. Well don't keep it to yourself — send it here. We pay £5 for every tip and routine printed and £25 for a genuine Megawave.

Send your contributions to: ***Microwaves, PCN, 62 Oxford Street, London W1A 2HG.***

Stop the Atari colour cycle

Most Atari owners will know that POKE 77,0 will disable the colour rotation that starts after nine or so minutes without a key being pressed. this is fine in the kind of program where you can POKE this location regularly, but what happens when the computer is hung up waiting for an INPUT?

The short subroutine below POKEs a machine code routine into page 6 of memory and calls it with the USR function before returning to your own program. The routine POKES 77,0 as described above but it does this during the Vertical Blank Interrupt (every 60th of a second). This will continue whatever else you give the computer to do until System Reset is pressed or the computer is switched off.

```
1000 FOR I = 1536 TO 1554: READ
     A: POKE I, A: NEXT I
1010 A = USR (1544): RETURN
1020 DATA 169, 0, 133, 77, 76, 95,
     228, 96, 104, 162, 6, 160, 0, 169,
     6, 32, 92, 228, 96
```

To check that the routine is working correctly add the following two lines and RUN.

```
10 GOSUB 1000
20 ?PEEK (77): GOTO 20
```

This will demonstrate that location 77 does not increment as normal.

Neil Davies,
Wirral, Merseyside

Applied ingenuity on the Amstrad

Three weeks ago I bought an Amstrad CPC464 for word processing purposes and was dismayed to find that the Amsword word processor, supposed to be available in the first week of July, would not be ready until the last day of July or the beginning of August.

I needed the word processor urgently and could not wait that long. However, using the excellent user-definable keys facility of the Amstrad micro anyone can turn this machine into an electronic typewriter using a printer (in my case a Star Gemini 10X).

The following program will turn the numeric keypad — from keys 0,.,Enter,1, to 4 — into coded keys for various fonts: Double Strike Condensed, Double Strike Emphasized, Double Strike Italic, Normal, Double Strike Enlarged Emphasized (which gives a better yet similar print to Double Strike Enlarged), Double Strike Enlarged Italic and a diminutive Condensed Subscript.

Other fonts can be programmed in the same way, but you can quickly run out of redefinable memory space.

By starting each line of text with a single key stroke, then finishing each line with Enter, you can download to the printer one line at a time. The excellent editing facilities of the Amstrad make writing fairly straightforward. You have to turn the printer off and on again to clear the previous font code before keying in the next choice. Normal requires one space after the code if you want to print the first character.

Tony van Dam,
Worthing, West Sussex

```
5 CLS:MODE 2:INK 0,15:INK 1,0:BORDER 15
10 KEY 129,"print "+CHR$(35)+CHR$(56)+CHR$(44)+CHR$(34)
   +CHR$(27)+CHR$(71)+CHR$(27)+CHR$(15)
20 KEY 130,"print "+CHR$(35)+CHR$(56)+CHR$(44)+CHR$(34)
   +CHR$(27)+CHR$(71)+CHR$(27)+CHR$(69)
30 KEY 129,"print "+CHR$(35)+CHR$(56)+CHR$(44)+CHR$(34)
   +CHR$(27)+CHR$(71)+CHR$(27)+CHR$(52)
40 KEY 129,"print "+CHR$(35)+CHR$(56)+CHR$(44)+CHR$(34)
   +CHR$(27)+CHR$(87)+CHR$(0"
50 KEY 129,"print "+CHR$(35)+CHR$(56)+CHR$(44)+CHR$(34)
   +CHR$(27)+CHR$(71)+CHR$(27)+CHR$(87)+CHR$(1)+CHR$(27)+
   CHR$(69)
60 KEY 131,"print "+CHR$(35)+CHR$(56)+CHR$(44)+CHR$(34)
   +CHR$(27)+CHR$(71)+CHR$(27)+CHR$(87)+CHR$(1)+CHR$(27)+
   CHR$(52)
70 KEY 132,"print "+CHR$(35)+CHR$(56)+CHR$(44)+CHR$(34)
   +CHR$(27)+CHR$(15)+CHR$(27)+CHR$(83)+CHR$(1)
```

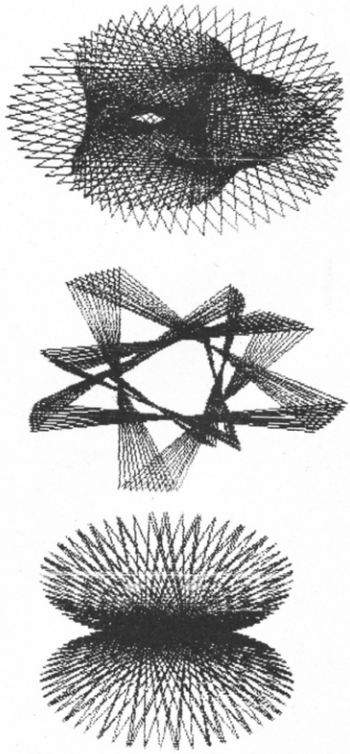
Spectrum spiral illustrator

I have written a program that produces interesting drawings on the Spectrum.

On running, the program will ask you to enter a number between 1 to 5. This alters the step value at line 50 and will draw a different picture for each number. Decimals are just as valid as whole numbers, and there is also a copy option.

Mike Day,
St Peter Port, Guernsey

```
  10 CLS
  20 INPUT "ENTER A NUMBER BETWE
EN 1 AND 5 ";P
  50 FOR N=0 TO 500 STEP P
  60 LET X=128+50*COS (N)-40*COS
 (N*P)
  70 LET Y=88+60*SIN (N)-20*SIN
 (N*P)
  80 IF N=0 THEN PLOT X,Y
  90 DRAW X-PEEK 23677,Y-PEEK 23
678
 100 NEXT N
 110 PAUSE 50
 120 INPUT "COPY (Y/N) ? ";A$
 130 IF A$="Y" OR A$="y" THEN CO
PY : GO TO 120
 140 IF A$="N" OR A$="n" THEN GO
 TO 10
```



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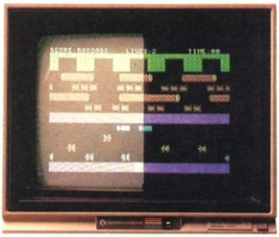

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PCN's regular look at the new books — which are worth picking off the bookshelves?

'Getting started with the Atari 600XL' by Peter Goode, published by Phoenix at £5.95 (paperback, 141 pages).

One of the better learn-as-you-flick-through books for the 600XL, and first-time users will find it gives an excellent introduction to their new machine's Basic.

Peter Goode's style is simple but not patronising, and he takes the tedium out of fundamental programming techni-, es with some entertaining routines.

The first part deals with elementary commands and program structures and gives a clear break-down of the Atari's mathematical functions with a step-by-step explanation of numerical and string variables.

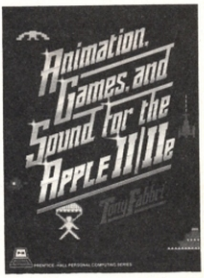
Once past that the reader moves on to the real goodies of sound and graphics — a section which gives the author ample opportunity to plug his book of listings for the 600XL.

He has exploited that chance by including two programs from the book, which will be a little disappointing for those who have already spent some time typing them in.

Nonetheless, the examples given are a good introduction for the beginner, though the Atari's Player/Missile sprite system is skipped over with the somewhat misleading suggestion that it is outside the scope of Basic.

Similarly, a chapter on 'advanced programming' is so superficial that it might as well not have been included, except that it serves as an introduction to yet another listing from Peter Goode's other book — a text adventure.

Considering the limitations, the book makes a good primer for the 600XL but most users will outgrow it within a few hours. **SC**



'Animation, games and sound for the Apple II/Ile' by Tony Fabbri, published by Prentice Hall at £14.95 (paperback 178pp).

The failing of this book is simple . . . it doesn't even begin to use the facilities mentioned in its title. In fact, a better title might have used the words 'terminals', since every example relies totally upon text. A small spaceship is<=*=>, and so on. Pretty, on a cheap Hazeltine; a waste of space on a machine which can handle block animation.

Not even a mention of the LoRes Graphics keywords PLOT, HLIN, VLIN, and COLOR, let alone the HiRes analogues HPLOT, DRAW, HCOLOR and, of course, not a lot of machine-code. This makes the choice of the Apple less than sensible since it is these very features which distinguish the machine, and which have been at least exploited and explained in other books, if not perhaps as lucidly as might be wished.

Unfortunately, in a section dealing with quizzes and multi-choice options in games, Mr Fabbri displays a poor grasp of structure which leads to some very clumsy code, and which leads me to feel this is simply another desperate grab for some of the action. Not recommended at the price . . . too few pages with too little on them. **RK**

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.....

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.....

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How to use the 'Player' part of the Atari's Player/Missile Graphics, explained by Frank O'Dwyer.

Drawing in players

If you have ever tried to write games with animation in Atari Basic using character movement, chances are the best you've come up with is a slow flicker or an unconvincing wobble across the screen. But there is a system already built into your Atari known as Player/Missile Graphics. This allows you to create up to four smoothly moving objects (called Players) together with four other objects (suggestively titled Missiles).

What's more, each object can have its own colour, and collisions between objects are automatically detected for you. There's just one problem. Atari Basic has no commands to allow you to use P/M graphics, so everything has to be done using POKES. This can be offputting to the beginner who wants smooth graphics on the screen with the minimum of fuss, so here is a step by step guide to setting up P/M graphics in your own programs, and a set of subroutines to use without getting into the technicalities of how the P/M system works.

The method we will use is the *overlay method*, which uses string manipulation to move the players around the screen. To initialise the overlay method, you will need program 1.

Its effect is to reserve the memory needed for the P/M graphics and fill it with zero bytes leaving it ready to use. It also gives meaningful names to some of the major memory locations.

This routine reserves 2K of memory for the P/M system. According to many sources you should reserve at least 4K if you intend to use Graphics 7 or Graphics 8 in your program. If you intend to use these modes, change POKE 106,A in line 10040 to POKE 106,A-8.

You also need routines to enable and disable the P/M system, and a routine to reclaim your lost 2K (if you didn't do this you would lose an extra 2K every time you ran your program). These are presented in program 2.

If you changed line 10040 in program 1, change line 10160 to:

```
10160 POKE 106,PEEK(106)+16: GRAPHICS 0:
RETURN
```

You now have enough routines to manage four players (we will not discuss missiles here since Basic is too slow to use them), but how do we define what the players look like? Suppose we want a player in the shape of an arrow. Imagine the shape is to consist of rows of eight light bulbs, each of which can be on or off, and that we will represent a bulb that is on with a full stop '.', and one that is off with a zero '0'. Our arrow shape might look like:

```
000.0000
00...000
0.0.0.00
000.0000
000.0000
```

The next thing to consider is by how much we wish to be able to move the arrow in a vertical direction. Suppose we are happy moving it one screen row at a time, we must introduce two blank rows either end of the arrow.

Do not move by more than one screen row at a time if you want smooth motion. At this point what is needed is a way of translating this picture of our shape into the binary form the computer uses. Program 3 will help.

You must write part of the next subroutine yourself. The first two lines are always the same, and the remainder of Program 4 gives the lines needed for the arrow example.

From this you can see how other shapes can be created, just by adding more code after line 10,300.

When you have defined all the shapes you need, add the instruction RETURN to the subroutine. Now all the shape information is contained in the strings you have DIMed, *ie* ARROW$, BOX$ *etc*.. Note there is no real limit to the number of rows in your shape, though 128 rows is the most that may be displayed at one time.

Also, though there are four players only, you may define as many shapes as you like, but only four on screen at any one time.

The next thing to be specified is colour. There's no Atari command to set the colour for players, so you must use a POKE. To set the colour for player 1, you use the following format:

```
POKE COLOR1,HUE×16+LUMINANCE
```

So to set the colour to bright white POKE COLOR1,15 (*ie* POKE COLOR1, 0×16+15). For the other players use POKES to COLOR2,COLOR3 and COLOR4. Note the colour for players is completely independent of the normal SETCOLOR command, giving you four extra colours in effect.

Now you have specified shape and colours for the players, how do you move them around the screen? Suppose you want to place a player at co-ordinates X,Y (not to be confused with screen co-ordinates X,Y), X may be from 0 to 255 and Y may be from 1 to 128. Some co-ordinates are 'off-screen', *ie* the player will not be seen at these co-ordinates, and these co-ordinates vary according to the shape you have chosen and the TV set in use. Here's how you do it for player 1:

```
POKE POS1,X: P1$(Y)=SHAPE$
```

You substitute your own shape string for SHAPE$, *eg* in the arrow example:

```
POKE POS1,X: P1$(Y)=ARROW$
```

To move the shape, simply recalculate X and Y. For example, to move the player across the screen horizontally you might use:

```
FOR X=0 TO 255: POKE POS1, X:
P1$(Y)=ARROW$: NEXT X
```

or, since Y does not change:

```
P1(Y)=ARROW$: FOR X=0 TO 255: POKE
POS1,X: NEXT X
```

When moving the player vertically, you cannot exceed the maximum rows per move you decided on when defining the shape, or some of it will be left behind on the screen as the player moves. There is no restriction on horizontal movement, however.

To make a player disappear, use:

```
P1$=CLEAR$
```

The same techniques apply to the other players. Simply use P2$,P3$, or P4$ in place of P1 as appropriate. Program 5 uses the subroutines already given to move the arrow around the screen under control of a joystick in port number 1.

The lower case characters should be typed in inverse, and the line numbers should be followed exactly since I will be adding lines. The rest of the program is the subroutines already discussed, *ie* lines 10000 to 10300 plus the following line:

```
10310 RETURN
```

PROGRAM 1

```
10000 REM SUBROUTINE TO SET UP OVERLAY METHOD
10010 DIM P1$(1),P2$(1),P3$(1),P4$(1)
10020 P1$="": STMCUR=PEEK(138)+PEEK(139)*256:
OFFSET=(PEEK(STMCUR+5)-128)*8
10030 DIM CLEAR$(128): CLEAR$(1)=CHR$(0):
CLEAR$(128)=CHR$(0): CLEAR$(2)=CLEAR$
10040 A=PEEK(106)-8: POKE 106,A: GRAPHICS 0:
POKE 54279,A: VVT=PEEK(134)+PEEK(135)*256+OFF
SET: STARP=PEEK(140)+PEEK(141)*256
10050 PLAYER=256*A+512-STARP
10060 FORX=2 TO 26 STEP 8: HI=INT(PLAYER/256)
: LO=PLAYER-256*HI: POKE VVT+X,LO: POKE VVT+X
+1,HI: PLAYER=PLAYER+128
10070 POKE VVT+X+4,128: NEXT X
10080 P1$=CLEAR$: P2$=CLEAR$: P3$=CLEAR$: P4$
=CLEAR$: P1PF=53252: P2PF=53253: P3PF=53254:
P4PF=53255: PRIOR=623: LET COLOR1=784
10090 LET COLOR2=705: LET COLOR3=706: LET COL
OR4=707: SIZE1=53256: SIZE2=53257: SIZE3=5325
8: SIZE4=53259: HITCLR=53278
10100 P1PI=53260: P2PI=53261: P3PI=53262: P4P
I=53263: POS1=53248: POS2=53249: POS3=53250:
POS4=53251: WHERE=A*8: RETURN
```

PROGRAM 2

```
10110 REM SUNROUTINE TO TURN ON P/M GRAPHICS
10120 POKE 559,46: POKE 53277,3: RETURN
10130 REM SUBROUTINE TO TURN OFF P/M GRAPHICS
10140 POKE 559,34: POKE 53277,0: FOR GRAF=532
61 TO 53265: POKE GRAF,0: NEXT GRAF: RETURN
10150 REM SUBROUTINE TO RECLAIM MEMORY
10160 POKE 106,PEEK(106)+8: GRAPHICS 0: RETUR
N
```

PROGRAM 3

```
10170 REM SUBROUTINE TO ENCODE ONE ROW OF PLA
YER SHAPE (READING FROM DATA STATEMENTS)
10180 P=128: SHAPE=0: READ ROW$: FOR BIT=1 TO
8: IF ROW$(BIT,BIT)="." THEN SHAPE=SHAPE+P
10190 P=P/2: NEXT BIT: RETURN
```

PROGRAM 4

```
10200 REM SUBROUTINE TO SET UP SHAPES FOR PLA
YERS
10210 DIM ROW$(8): RESTORE 10240
10220 DIM ARROW$(7): FOR ROW=1 TO 7: GOSUB 10
100: ARROW$(ROW,ROW)=CHR$(SHAPE): NEXT ROW
10230 REM SHAPE FOR ARROW FOLLOWS
10240 DATA 00000000
10250 DATA 000.0000
10260 DATA 00...000
10270 DATA 0.0.0.00
10280 DATA 000.0000
10290 DATA 000.0000
10300 DATA 00000000
```

PROGRAM 5

```
100 OVERLAY=10010: ENABLE=10120: DISABLE=101
40: RECLAIM=10160: SHAPES=10210: REM GIVE SU
BROUTINES MEANINGFUL NAMES
110 GOSUB OVERLAY: GOSUB SHAPES: REM ENABLE
OVERLAY METHOD AND DEFINE SHAPES
120 X=100: Y=80: POKE COLOR1,15: REM INITIAL
ISE COORDINATES FOR ARROW AND SET ITS COLOR
TO WHITE
130 GRAPHICS 17: GOSUB ENABLE: REM USE GRAPH
ICS 1 WITHOUT TEXT WINDOW AND ENABLE P/M GRA
PHICS (STILL DON'T SEE ANYTHING ON SCREEN)
140 ?#6;"Use joystick to move the arrow Arou
nd the": POSITION 6,2: ?#6;"Screen"
150 POSITION 1,6: ?#6;"Press trigger to: POS
ITION 3,7: ?#6;"exit program"
160 POKE POS1,X: P1$(Y)=ARROW$: REM PUT ARRO
W ON THE SCREEN AT X,Y
190 S=STICK(0): T=STRIG(0)
200 IF T=0 THEN GOSUB DISABLE: GOSUB RECLAIM
: END: REM IF TRIGGER PRESSED THEN DISABLE P
/M AND RECLAIM MEMORY BEFORE EXITING PROGRAM
210 IF S>15 THEN 160: REM IF JOYSTICK CENTRA
L THEN DO NOTHING
220 POKE 77,0: IF S=7 THEN X=X+1: IF X>200 T
HEN X=20: REM MOVE X COORDINATE RIGHT.  POKE
77,0 STOPS THE ATARI GOING INTO ITS COLOR CY
CLING ROUTINE
230 IF S=11 THEN X=X-1: IF X<46 THEN X=46
240 IF S=13 THEN Y=Y+1: IF Y>187 THEN Y=187
250 IF S=14 THEN Y=Y-1: IF Y<16 THEN Y=16
260 GOTO 160
```

When you run the program, you should see the white arrow, and it should respond to the joystick control. Try moving the arrow over the text on the screen and see what happens. The arrow appears to pass over the text. This is the result of a priority system which gives players priority over text. It is possible to change priorities so players pass behind text, or behind some text and over other text in another colour.

Priority	Code Number
Players 1-4, Colors 0-3, Background	1
Players 1-2, Colors 0-3, Players 3-4, Background	2
Colors 0-3, Players 1-4, Background	4
Colors 0-1, Players 1-4, Colors 2-3, Background	8

POKE PRIOR, code number

Try changing line 120 to

```
120 X=100: Y=80: POKE COLOR1, 15: POKE
 PRIOR, 8
```

I said earlier that collisions between players are automatically detected. In fact, the system can also detect collisions between the players and character on the screen. To find out if a collision has occurred between a player and a character, use:

PEEK(P1PF)

This equals zero if no collision has occurred, and non-zero if it has. The P1PF stands for 'player 1 to playfield collision' by the way. For the other players, use P2PF, P3PF, *etc.* In fact, these registers tell you more than just whether you have collided with the background characters. They also say what *colour* the character was. This is encoded as follows:

COLOUR	PEEK (P1PF)
0	1
1	2
2	4
3	8

If you collide with a character whose colour is controlled by SETCOLOR 0,C,1 then PEEK(P1PF) will equal 1, for example. Collide with more than one character at a time, however, and things get hairy. PEEK(P1PF) will equal the *sum* of the individual collisions. Here is an example of collision detection using the example program. Just add the following lines:

```
170 POKE HITCLR, 0: POSITION 4,11: ?#6; "10
 SPACES": SOUND 0,0,0,0
180 POSITION 4,11: IF PEEK (P1PF)<>0 THEN ?
#6; "COLLISION": SOUND 0,20,10,8
```

The effect of POKE HITCLR,0 is to clear any previous collisions from all the collision registers. When you run the program, it senses when the arrow collides with the text. You could use this feature in a game to detect when a spaceship hits an asteroid, or another spaceship. You can detect collisions between players using PEEK(P1PL), where P1PL stands for player 1 to player collisions. For the other players use P2PL,P3PL *etc.* The registers also tell you which player you have collided with, as follows:

PEEK (P1PL)	Player you have collided with
1	1
2	2
4	3
8	4

Again, if you collide with more than one player, PEEK(P1PL) equals the sum of the individual collisions.

The only registers left to discuss are the SIZE registers. There is one for each player, and they allow you to display players in normal, double, or quadruple width.

In order to effect this change you must POKE the appropriate SIZE register with the desired code chosen from the table below:

Size	Width
0	Normal
1	Double
2	Normal
3	Quadruple

Try adding the following line to the example program:

```
125 POKE SIZE1,1
```

You should see the arrow in double width.

PCN

All good things must come to an end, and so it is with Keith Hook's assembler series for the Z80 processor.

Graphics generation

If you've been following *PCN*'s series on Z80 assembly programming you should now know how to produce faster and more efficient programs. This concluding instalment ties up the graphic generator program, which should give you a good idea of what is possible in assembler, and show you how some of the techniques you've learned can be used.

The two preceding parts of the graphic generator program appeared in *PCN* issues 67 and 69, available from the *PCN* Back Issues Service, 53-55 Frith Street, London W1A 2HG.

The Graphic Generator program is self-contained and can be run on its own. However, it would be better if you wrote a subroutine to allow you to save the designs on tape. In this way you could use the characters in any of your programs by reloading the data from tape.

When the program is first entered, a message appears on the very first line of the screen: 'Press G for Graphics or F for finish.' The very first thing to do is write a routine at the Label 'Finish', that allows you to exit gracefully from the program by returning to Basic.

Pressing G takes you into the main graphics routine. On the top line of the screen there will be 16 solid blocks displayed. On the line underneath, directly under the very first block, you will see the # cursor. You should also notice that an asterisk * is displayed in the right-hand top corner of the screen. Whenever this asterisk is present you can move the # cursor along the graphic blocks to select another block. Pressing D causes the asterisk to disappear and the graphic directly above the # cursor will be copied into an 8 × 8 matrix displayed in the middle of the screen.

The very first graphic is CHR$(128). If you press + this moves the graphics displayed on the top line to the next block of 16 characters which would be CHR$(143) up. You can move up four blocks of 16 characters. Conversely, pressing the – (minus) key causes the next lower block of 16 characters to be displayed. You can also use these keys while the asterisk is showing, otherwise they have no effect.

Whenever the matrix is on display the character under the # cursor is displayed within it. If you wish to change this character you can press the CLR key to delete the character completely, or you can move the block cursor around the matrix, and by pressing the space bar delete one block, or by pressing the 9 key, set one block.

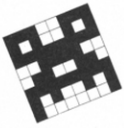
Once satisfied with your design, press Enter to have it entered in memory. You should now see it displayed, actual size, directly above the # cursor. The matrix will have been cleared from the screen, and you will notice the asterisk redisplayed in the right-hand corner of the screen. Thus, the sequence begins again.

The # cursor is moved left with the computer left cursor key and right with the computer Tab right key. All other keys are documented within the program.

If you have read the last six articles on learning machine code, you will get a good insight into how most of the commands discussed are used by studying the complete listing for this program. PCN

Program notes

This routine is called when the # cursor is moved and checks to see if it is still within legal limits, which is no further left than the first character or no further right than the last character displayed on the top line. These values for the Genie are 4432H and 4443H = 16 spaces. It then takes steps to correct the error before displaying.



```
        ; *  GRAPHIC GENERATOR.. FINAL PART  *
        ; ***********************************
; This section to follow directly after the first section published
; < week 67 >
; *** NOTE  LINES MARKED  ^^ MEANS LABLE ALREADY EQUATED IN PREVIOUS
; LISTING.
;
DISP:
        LD      HL,TOPLIN       ;TOP LINE SCREEN 12 COLS IN  ^^
        LD      A,(GRAFNO)      ;GET GRAPHICS ASCII NUMBER.
        LD      B,10H           ;COUNT TO DISPLAY 16 GRAPHICS.
DISP1:
        LD      (HL),A          ;PUT GRAPHIC ON SCREEN.
        INC     HL              ;NEXT SCREEN LOCATION.
        INC     A               ;NEXT GRAPHIC CHARACTER.
        DJNZ    DISP1           ;DO IT 16 TIMES
        LD      A,"#"           ;CHARACTER CURSOR.
        LD      (IX+00H),A      ;PUT IT ON SCREEN... IX POINTS TO
                                ;NXTLIN (2ND LINE 12 COLS IN).
        RET                     ;ALL DONE SO RETURN TO CALLER.
FLEFT:
        PUSH    IX              ;IX = "#" CUSRSOR POSITION SO ....
                                ;PUSH IT ON STACK TO
        POP     HL              ;PUT IT IN HL
        LD      A,20H           ;SPACE CHARACTER
        LD      (HL),A          ;BLANK OUT "#"
DECL:
        DEC     HL              ;NOW DECREMENT POSITION 1 PLACE.
        LD      A,L             ;GET LSB OF ADDRESS IN A
        CP      33H             ;1 POSIT LESS THAN LEFT-MOST GRAPHIC.
        JR      Z,INCL          ;IF ZERO GONE TOO FAR LEFT--GO CORRECT.
        JR      MVECUS          ;OK SO RE-DISPLAY AT NEW POSIT.
FRIGHT:
        PUSH    IX              ;IX = "#" CSR POSITION.
        POP     HL              ;POSITION NOW IN HL.
        LD      (HL),20H        ;ANOTHER WAY OF BLANKING OUT "#".
INCL:
        INC     HL              ;INCREMENT "#"CSR POSITION 1 PLACE.
        LD      A,L             ;LSB OF NEW ADDRESS IN A
        CP      44H             ;TEST TO SEE IF MOVED TOO FAR RIGHT.
        JR      Z,DECL          ;IF SO... GO DECREMENT AND RE-TEST.
MVECUS:
        LD      A,"#"           ;CURSOR CHAR
        LD      (HL),A          ;PUT IN NEW POSITION ON SCREEN.
        PUSH    HL              ;PUT ON STACK TO..
        POP     IX              ;PUT IN IX SO THAT IX = "#" POSIT.
        JP      GET             ;GO TO RE-SCAN KEYBOARD.


RPLCE:
        LD      IY,(GRFPTR)     ;IY POINTS TO CURRENT ASCII NUMBER.
```

This routine calculates the buffer entry for a character pointed to by the # cursor and a rotate with carry is performed to display the character on the matrix. This works as follows: if the rotate results in a carry then a block is set in matrix, otherwise the routine skips to the next bit. On exit, an enlarged representation of the graphic is displayed in matrix.

This routine is entered if a request is made to clear a character out of matrix and to replace it with a new design. The routine clears the matrix by replacing blocks with matrix squares character 0E9H.

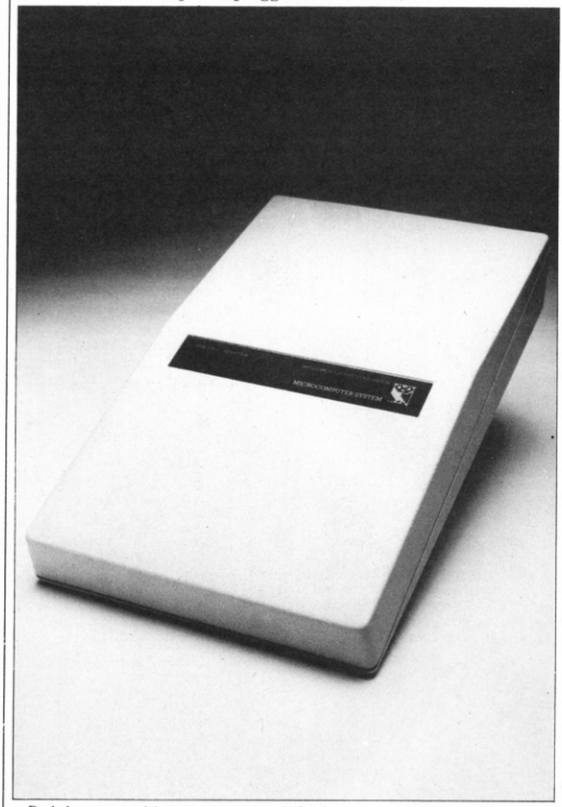
This routine does a rotate left though carry:
/\———[c]——<[7 6 5 4 3 2 1 0]<———
The contents of carry is moved into bit 0, the contents of bit 7 is moved into carry and the result is stored back in (IY + 00H). If a block in matrix is set, carry will be set after CP with OE8H, so a bit is set <1> if no carry bit is reset <0>. This makes the final byte equal to blocks set and not set in matrix, *eg* first byte 11100100.

Finish: This is part of the program that you will develop yourself. You could write a short routine of call one from your machine ROM that allows you to save the buffer to tape — so that you can load it back in with all your graphics preserved. Most machines allow a ROM CALL to save to tape.

```
RPLCE1:
        LD      HL,0F151H       ;START OF MATRIX IN COLOUR RAM POSIT
                                ; ON GENIE OTHER USERS REPLACE WITH
                                ;LD HL,SCRN
        RET
FNDCHR: PUSH    IX              ;SAVE "#" CSR POSIT.
        POP     HL              ;TO PUT IN HL.
        LD      DE,FFD8H        ;FFD8 ADDED TO SCREEN POSIT..
        ADD     HL,DE           ;DECS 40 FROM SCREEN POSIT FOR
                                ;<40 COLS SCREENS>
                                ;THIS ALIGNS TO GRAPHIC ABOVE # CSR
        LD      A,(HL)          ;ASCII NUMBER OF CHAR NOW IN A.
        SUB     80H             ;80H=128 =ASCII START OF OUR USER DEFS.
                                ;IF >THAN 128 REMAINDER = DISPLACEMENT
                                ;INTO GRAPHIC BUFFER.
        JR      C,RPLCE         ;LESS THAN 128 GO NORMALISE TO 128
        LD      HL,00           ;ZERO FOR ADD HL
        LD      L,A             ;DISPLACEMENT NOW IN HL.
        ADD     HL,HL           ; MULTIPLY BY 2
        ADD     HL,HL           ; DISP NOW *4
        ADD     HL,HL           ;NOW * 8. HL NOW =START OF THIS
                                ;CHARACTER IN BUFFER FROM 128'S POSIT
        LD      DE,BUFFER       ;DE = START OF BUFFER
        ADD     HL,DE           ;HL = CHARACTER POSIT IN BUFFER.
        PUSH    HL              ;PUT HL ON STACK TO
        POP     IY              ;PUT INTO IY
        PUSH    IY              ;KEEP IT SAFE
        LD      HL,SCRN         ;^^ START OF MATRIX
        LD      DE,20H          ;PREPARE DE FOR ADDING TO HL
        LD      C,08            ;
RTE:
        LD      B,08            ; C=8:B=8= 8*8 = 64 MATRIX POS
ROTATE:
        RLC     (IY+00H)        ;ROTATE LEFT WITH CARRY
        JR      NC,INCR         ; IF NO CARRY  SKIP TO NEXT BIT
        LD      (HL),BLOCK      ;^^ IF CARRY SET BLOCK IN MATRIX.
INCR:
        INC     HL              ;POINT HL TO NEXT MATRIX SQUARE.
        DJNZ    ROTATE          ;DO IT 8 TIMES
        ADD     HL,DE           ;POINT HL TO NEXT LINE OF MATRIX.
        INC     IY              ;POINT IY NEXT BYTE IN BUFFER
        DEC     C               ;
        JR      NZ,RTE          ; DO OTHER ROUTINE ANOTHER 8 TIMES
        POP     IY              ;GET CSR POSIT BACK IF ALL DONE.
        JP      RPLCE1          ;GO ALIGN HL BEFORE RETURNING.
INPUTG: LD      HL,SCRN         ;^^ POSITION OF MATRIX ON SCREEN.
        LD      DE,20H          ; THIS IS FOR ADD HL
        LD      C,08            ;HERE WE GO AGAIN 8*8=64 POS
DOVER:
        LD      B,08            ;
LDMAT:  LD      (HL),MATCHR     ;^^ MATRIX CHAR 0E9H
        INC     HL              ;IS PUT ON SCREEN & SCREEN INC'D
        DJNZ    LDMAT           ;DO 8 TIMES
        ADD     HL,DE           ;NEXT LINE OF MATRIX
        DEC     C
        JR      NZ,DOVER        ;IF <>0 DO OVER AGAIN.
        CALL    RPLCE1          ;ALIGN HL
        JP      GRAFIK          ;AND GO AND DESIGN NEW CHARACTER.
RESTORE:
        LD      HL,SCRN         ;^^ HL = SCREEN POSIT OF MATRIX.
        LD      DE,20H          ;HERE WE GO AGAIN SEE LAST SECTION
        LD      C,08H           ;SAME EXPLANATION...
LPA:
        LD      B,08H
LPB:
        LD      A,(HL)          ;GET CHAR FROM MATRIX
        CP      MATCHR-1        ;0E8H IF LESS THAN MUST BE BLOCK
                                ;AND CARRY FLAG WILL BE SET
        RL      (IY+00H)        ;MOVE CARRY INTO BIT 0 .
        INC     HL              ;NEXT MATRIX POSITION .
        DJNZ    LPB
        INC     IY              ;NEXT BUFFER BYTE
        ADD     HL,DE
        DEC     C
        JR      NZ,LPA
        JP      GRAPHIC         ;FINISHED WITH THIS CHARACTER
                                ;DO IT AGAIN
;
;STORES.......
GRFPTR:DEFW 0000H
GRFNO: DB 00H
;
;
FINISH:
```

Acorn Calling

Acorn's Prestel adaptor is plugged onto David Janda's Beeb.



Acorn has entered the modem race with a Prestel adaptor and EPROM-based software to drive it. This is one of those Beeb add-ons that was due a long time ago, but until now had failed to materialise.

The features of the software indicate that the 1200/75 baud adaptor is aimed at the Prestel user, but it can be used with other Viewdata systems.

Features

The adaptor operates at only one baud rate — 1200/75 — and it's connected to the telephone system via the new type of BT socket. The 1200/75 baud rate is compatible with Prestel and other Viewdata systems *eg* bulletin boards operated by some local authorities. It is possible to alter some characteristics of the modem, which may be necessary if you wish to use a service other than Prestel.

The only noteworthy feature of the adaptor itself is its built-in auto dial which makes it possible to dial Prestel or whatever from the comfort of your keyboard. There's also a small built-in speaker from which you can hear the adaptor dialling.

What makes the adaptor worth looking at is the menu-driven software that controls the whole operation. The flexibility of the package enables you to use the adaptor from menu-level or by setting up boot frames that contain either Beeb OS commands or Prestel commands. Text can be included in these frames too, so it is feasible to set up the function keys with a boot file that allows you to dial a Prestel computer, enter the ID and password — all at the touch of a function key.

On a more simple level is the operation of the software that will be used more frequently. Once *PRESTEL is entered, a menu of commands is displayed on the lower lines of the screen. The Beeb's function keys have been set up with these commands, most of which have a dual function.

There are commands to allow frames to be saved to disk or tape. These frames can then be loaded either on or off line and edited using a simple but powerful editor, allowing access to all the graphics and colours of Mode 7. Edited frames can then be resaved, or uploaded to Prestel, thus allowing you to prepare frames offline.

Telesoftware can be downloaded easily. Once the program is loaded into the Beeb it can be saved under its default name or you can give it another name.

One handy feature is the ability to get hard copy. Simply selecting a frame and pressing f9 will dump text to your printer. Graphics are reproduced as *, but this can be altered by tweeking the software.

Setting up

The adaptor is housed in the now standard Acorn add-on box, which is a similar colour to the Beeb and slopes at the front. There are three cables attached to the adaptor — power, phone and RS423 leads.

Both the power and the telephone cables are of a reasonable length, which cannot be said of the RS423 cable: it is so short that the adaptor must sit directly next to the Beeb. Another word of warning: the RS423 cable plug can be inserted into the Beeb upside down, with no indication that things have gone wrong as there is not even a power light on the adaptor.

All in all, the ergonomics of the adaptor are not too good. With more and more peripherals coming from Acorn, perhaps these boxes should have been of the rack variety.

In use

Pressing f3 to make a call requires you to press Return before you can enter the number, which seems a little strange at first.

However, I was soon roaming the Prestel frames (thanks to Micronet 800 for the demo account) and using the facilities of the EPROM software. The features provided are very useful. For example, pressing the left arrow key moves back one frame and so on. Frame tagging is also provided which allows important frame numbers to be 'noted' by the micro.

Verdict

It's unfortunate that the Acorn adaptor is simply a 1200/75 modem, for it doesn't do justice to the excellent software that accompanies it. Modems generally offer much more than this: person to person communication and 300/300 baud, for instance.

PCN

Name Acorn Prestel Adaptor **Machine** BBC Micro **Application** Viewdata filing system **Price** £113.85 **Availability** Acorn approved dealers.

SOFTWARE SPECIAL REPORT

INTEGRATED FUTURE

Ian Scales and Geof Wheelwright examine the heritage of Apple's Lisa.

The most exciting software development this year has to be 'integrated' packages. These are single programs which feature the applications programs most users buy first: word processor, database, spreadsheet, and communications.

Some hardware manufacturers have been 'bundling' such packages with their products for a while, but there are problems with this. All too often the data formats are incompatible, so you can't easily use data from the spreadsheet in the word processor. To do so requires leaving one program and swapping one disk for another.

PCN PRO-TEST SOFTWARE

Integrated programs should solve these problems once and for all. In them you have the main reasons for buying a micro for an office and it's easy to move data from one application to another without swapping disks. The disadvantage is that you'll probably have to buy some extra memory as well as the program itself.

In this comprehensive appraisal of integration, we'll be reviewing and comparing several new packages: Symphony (Lotus), Framework (Ashton-Tate), Decision Manager (Peachtree), Open Access (Software Products International) and Appleworks (Apple).

The integration of application programs is undoubtedly one of the most important microcomputer developments of the year. The success of Apple's Lisa, and perhaps more profoundly as far as the industry is concerned, the remarkable performance of Lotus 1,2,3 in the software charts, has spurred software publishers into a frenzy of integration.

Personal computing, for the business user, usually involves a handful of well-defined tasks — running a database, maintaining one or a number of spreadsheet models, and utilising a word processor for memos and business reports. A graphics facility is also popular for illustrating data from the spreadsheet, while a modem communications package or micro to mainframe facility is of increasing importance.

Anyone using a collection of packages soon discovers the frustration of being in the middle of one program and requiring information from another.

Integration means getting applications to relate to each other so you can transfer information, or simply access one application from another to check a detail.

Much fuss is made of metaphors — symbols which help you travel about the system and are, as far as possible, self-explanatory — Apple's Icons are a famous example.

Inside this rather wide definition of integration, however, lie a multitude of philosophies. About the only thing most of the systems have in common is the IBM PC, although there are products for the various Apples the Commodore 64 and even one on the way for the Sinclair QL.

There are two main integration choices: the first is to buy a one-off integrated package, such as those reviewed in these pages. Here the standard applications — word processing, spreadsheet, database and graphics are configured in one package.

The second option is to move into an 'integrating environment'. These products claim to enable you to configure your own 'mix' of applications and run them under the software. It is probably a little early to say how well such products — Visi-On or Microsoft Windows, for instance — will do in competition with products like Symphony and Framework.

Like any new technical buzz phrase, 'integrated software' is defined as many different things depending on who you ask. More importantly, this definition varies widely among software houses.

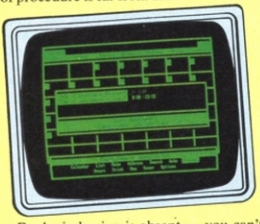
Many software products combine various aspects of true integration, but few are fully integrated. The qualities to look for in an integrated package are:

- **Commonality:** A truly integrated package will require that you only need learn one set of commands to use any of the applications within that package (*eg* word processor, database, spreadsheet, etc).
- **Windowing:** One of the great things about a good integrated software suite is the ability to see the data in several applications at once. The windows in such a suite should allow windows of any size and number on screen at once.
- **Data pipelining:** Having established on-screen windows, you should be able to use 'pipelines' between data under various applications to cause several sets of data to change at once. If, for example, you had one database window containing a set of financial data pipelined to a spreadsheet and that spreadsheet window was then further pipelined to a bar graph, a change of information in the database should automatically update the spreadsheet and bar graph windows.
- **Open endedness:** This is perhaps the most confusing and loosely-interpreted quality of integrated software you're likely to encounter. Few integrated software packages are really 'open ended' in the sense that you can use them in conjunction with other manufacturers' software, but some have announced a policy of offering development kits to allow other software houses to write applications 'modules' that expand the power of an integrated software suite.

OPEN ACCESS

Open Access was one of the first so-called integrated packages on the UK scene. It's really a collection of separate packages accessible from a front end 'options' menu — just one step away from the bundled suite approach.

Minimum system requirements are at least 192K and a pair of standard IBM floppy disk drives. Optimum benefit requires 256K, graphics board and a Winchester drive. It is possible to use the system with relative ease from the standard floppy disk set-up, albeit in a truncated form, but given the competition, this sort of procedure is far from attractive.

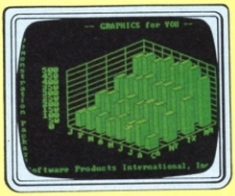


Real windowing is absent — you can't have one application displayed in a window in one part of the screen and work on another application in another. Windows are provided to display file directories and command key help.

Word processing: This facility is a file of about 5000 words can be worked on (with a 256K system). There is no word counter, but it does just about everything else. The block move is especially nice and easy to use.

Database: Information Manager is a relational database system. You can have up to five files sharing information and being reported on together. The system uses a sophisticated, English-like query language.

Spreadsheet: It features all the usual spreadsheet functions with the interesting addition of 'goal-seeking'. In a normal spreadsheet you set up a series of projected



costs and incomings to see how dire the financial situation is going to be over a certain time frame. Goal-seeking allows you to reverse the process. You can set up a profit or sales target and see just how hopeless it's going to be to reach it.

Graphics: The graphics package is only compromised by the difficult data transference procedures. However, its ability to create three-dimensional graphs and display a series of graphs on the screen at a time make up for this drawback.

Communications: Like most of the integrated packages, communications is viewed as very important. Unfortunately, most also set great store on the Hayes Smart Modem as the US standard. Still, all the usual comms facilities are well supported.

In use

The data transfer aspects are not the most sophisticated, but at least there is a commonality of structure and commands. There are three ways of transferring information. The 'context' method allows you to move the data with you as you go from package to package. A more conventional method involves writing the information to a SIF (standard interface file) and then bringing it back again. You can also write data to an ASCII file.

The variety of methods says something about the ease of integration — obviously, each method has advantages in a specific transfer context, which in turn means that there are situations in which any one of them is inadequate. This is unfortunate as the advantage of integration relates directly to how easy and unproblematical the transfer procedure is.

Verdict

Open Access bundles some good applications together and attempts to provide the illusion of integration by adding some transfer procedures and a front-end from which you can load each of the packages in turn.

The product is either a year too early or a year too late. A year ago the product may have seemed pretty nifty but in 1984, with the arrival of Symphony and Framework, shortcomings are painfully obvious.

If it were released in a year from now running under Microsoft Windows, it may have given its competitors a run for their money . . .

DECISION MANAGER

Decision Manager is aimed at the executive market and, as its title suggests, is seen primarily as a means of assisting management to consolidate company information and produce output in the form of graphs and financial models.

The system operates under MSDOS and needs 256K of RAM and an IBM PC or compatible, but a hard disk XT or compatible is necessary to make the most of it.

For data communications you'll need an 'Irma' board for the Microframe link and the modem must be capable of 300/1200 baud. A colour graphics card and monitor are necessary for the business graphics software, and the Microsoft mouse is a useful, though not compulsory, addition. This has been provided to make the system more attractive to 'keyboard-shy' executives, but command functions are equally

26▶

◀25 coherent when entered from a keyboard. In addition it can perform word processing tasks and can be used to build up local databases for specific purposes.

The micro-to-mainframe link is a key element in Peachtree's strategy — the trick is to make the system powerful yet easy to learn and use. Not an easy brief. Decision Manager can access a mainframe which supports the IBM 3270 protocol. The weak link in all these systems is the accessibility and friendliness of the mainframe or minicomputer system through which the user has to negotiate to get to the information.

The integration is very good, given the antecedents of the modules — the word processor, for example, is a pared-down version of Peachtext. Data is transferred between modules by means of an intermediate transfer file.

Windowing is a key feature. Up to 20 windows can be defined and four or five make a workable combination. Window sizes are flexible, easily changed and colours are variable with a few key strokes.

Spreadsheet: This is theoretically capable of working with 254 rows and 63 columns, while cells can contain up to 126 characters. Blocks can be protected and worksheets merged. The emphasis seems to be on ease-of-use. The mouse can be used to select cells and there are comprehensive error messages. Commands are displayed at the bottom of the page, and help screens provide additional back-up.

Graphics: The graphics module gives good integration with the spreadsheet, data manager or telecommunications modules. Three-dimensional graphs are possible and you can generate bar, pie and scatter charts as well as histograms, all with a variety of fills and outlines.

Word processing: This facility is a condensed version of the popular Peachtext package and makes full use of the IBM function keys with lots of pop-up help. Features include block move, and search and replace. It's not really a full-blown wordprocessor, but is designed to be used by the manager to add extra information to spreadsheet and graphics reports, as well as generate the odd memo or letter.

Database: The Data Manager is a reasonably powerful system. You can design input screens while standard defaults prevent the method taking on the aspects of a complete programming language like dBase II. Up to 32,000 records with 90 fields per record and 80 characters per field can be generated. Again, information can be transferred to other modules.

Communications: The comms aspect offers unlimited file size transfers and gives the user access to all the normal public access bulletin boards and databases. Under 3270 emulation, the user can

'capture' whole screens of information from a mainframe using an on-screen template. This can be adapted to capture only relevant information from the host system. Once captured, the data can be transferred to a transfer file and inserted in the spreadsheet or used to generate graphs.

In use

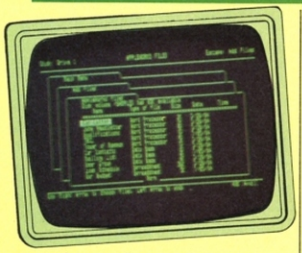
Although the windowing is comprehensive, there has been no attempt to provide a consistent set of metaphors — particularly useful in the depths of a diverse integrated software package to keep track of what's happening and where you are.

The pop-up menu features are helpful, but the problem with mouse technology is one of all or nothing — systems which have the mouse as an optional extra generally don't exploit its potential to the full. This constraint is noticeable with Decision Manager. Using the mouse means a lot of switching back to the keyboard to execute commands which are not mouse-supported. The package is just as usable without it, so unless you have a real dislike for the keyboard you should go mouseless.

Verdict

Decision Manager is a well-rounded product which trades off sophistication in some areas for ease-of-use. This is not a drawback: it's aimed at the executive in a company large enough to have a mini or mainframe computer and the extensive communications facilities reflect this bias. The integration is very sophisticated and the windowing very flexible.

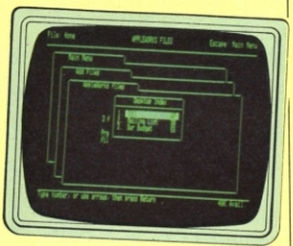
APPLEWORKS



Appleworks is one of the cheapest integrated software packages currently on the market — and one of the few developed for an eight-bit computer. It is significant for several reasons; it is Apple's first major attempt at integrated software apart from the Lisa and Macintosh programs. There are modules for word-processing, database management and spreadsheet work, it doesn't use Apple's mouse and it doesn't use 'pull-down' windows.

Appleworks was launched at about the same time as Apple's IIc portable version of the IIe and is one of the first major pieces of software to run on the new micro. Unfortunately, two disk drives are needed to take full advantage of the program. The IIc comes with a single drive, and a second has to be linked externally, detracting from the system's portability.

Nonetheless, Appleworks is one of the few pieces of integrated software that can be used effectively with floppy-disk only storage, but compared to the innovative integrated software developed by Apple for its Lisa and Macintosh computer,



Appleworks is pretty tame stuff.

As mentioned above, there are no real windows, few icons or fancy tricks — but that should come as no surprise, given that it's designed largely for use on the old eight-bit 6502.

To use Appleworks to its full, you'll need an Apple IIc with high-resolution green screen monitor and a second disk drive, or an Apple IIe with an 80-column card, 128K RAM, high-res monitor, printer interface and twin disk drives.

Spreadsheet: The Appleworks spreadsheet is pretty standard, offering a worksheet with a maximum of 126,000 cells and the usual range of formula and data copying, deletion and editing. The basic spreadsheet format is simple and data can be sent to printer, ASCII text file or the RAM-based 'clipboard', from where it can be transferred to the word processor.

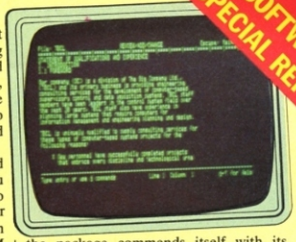
Word processing: This is probably the best of the Appleworks applications, covering most of the requirements of a good word processor: 80 columns, control of printer, text formatting and a sequence of simple and easily understood control sequences to handle the cursor, use of the disk drive and printing functions.

One of the best features about word processing under Appleworks is that you can easily switch between desk-top files to bring information from the database or spreadsheet into your work. The limitation to this, however, is the 128K RAM configuration. With no files on the desktop, you have about 55K to use. By the time you've loaded the application-specific code and a couple of files onto the desktop (and thus into RAM), the available memory declines considerably and you're left with between 10 and 20K.

Database: This is a competent — if unexciting — piece of software. You're given all you need to create alphabetically sorted databases with a limited number of records and files. Ordering your records is quite easy and formatting is via cursor-driven menu options. There's a nice 'zoom' option which allows you to get a detailed display of a given record very quickly.

In use

The memory limitations, the lack of pull-down windows and the ability to send information to only one application (from the spreadsheet or database to the word processor) obviously detract from the clever design of Appleworks. However,



the package commends itself with its commonality of commands, the use of a desktop metaphor, the ability to run several jobs at once (by having them on the RAM-based desktop) and the use of the Escape key to 'step-back' to previous levels without losing what you're working on.

Because Appleworks is such a simple package it scores very highly in the ease-of-use stakes, perhaps at the expense of the power of the package. The commands are all quite logical, most of the help menus you could possibly want are there and the cursor-driven nature of most operations makes them goof-proof.

Verdict

None of the modules within Appleworks are outstanding, though the word processor is good and the price competitive. Appleworks represents very good value for money over most of the stand-alone packages that compete with it in the sub-£200 price range.

FRAMEWORK

Framework represents a major departure for Ashton-Tate, which has won a reputation for building the tremendously powerful, but difficult-to-use database, dBaseII.

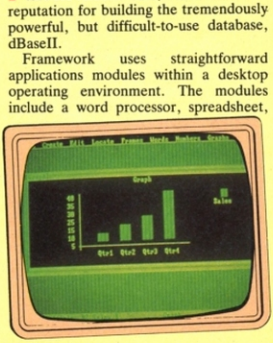
Framework uses straightforward applications modules within a desktop operating environment. The modules include a word processor, spreadsheet, business graphics system, database and telecommunications.

Apart from your PC, you'll need MS-DOS or Concurrent DOS, and at least 256K RAM and two 320K disk drives, while the addition of a colour graphics card substantially improves the output.

Moreover, a Winchester disk will make the system far more comfortable — on floppies it's workable, but frustrating.

In addition to the 'windowing' facility found on most integrated packages, Framework has the additiional advantage of holding its 'frames' or work-areas within a business-report style outlining system, so it helps you organise your work.

Spreadsheet: This is perhaps not as powerful a spreadsheet as that offered in 28►



◀27

Symphony, but then it does come from a company with a background of database development. The main thing about Framework's spreadsheet is that it gets the job done and it's easy to integrate with other packages.

Because of the nature of Framework, where you literally pick the type of work you want to do within a frame, it's easy to leave a number of spreadsheet frames, a few work-processing frames and a database frame or two all out on the desktop at once.

These desktop RAM-files can either be 'open' in windows or 'closed' in boxes at the side of the screen. The effect this has on spreadsheet work is to allow the inspection and use of lots of information at once.

Graphics: The graphics package in Framework lets you generate graphs based on data generated in spreadsheets and databases. The graphs are either high or low-resolution, depending on the hardware you're using.

Framework offers six types of graphs: barchart, stacked barchart, 'pie' chart, line graph, scattergraph and X-Y graph with numeric values in both axes. Graphs can be windowed and will change simultaneously if spreadsheets to which they are 'pipelined' are changed.

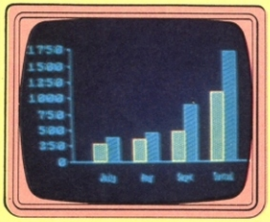
Communications: Framework's telecommunications module allows machine-machine communications, terminal emulation and modem communication. None of this is unusual, but what is interesting is the ability to send Framework 'frames' over the phone using two PCs.

Instead of having to convert all the information you're sending to ASCII format, you can send frames, still configured as spreadsheets, databases or even graphs, over the telephone.

This type of communication makes Framework ideal for a big business environment, even though this ability to send frames is only useful if you're sending files or frames created under Framework.

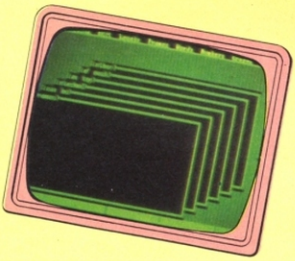
Word processing: The word processor, like most of those found in integrated packages, is pretty simple and relatively easy to use. It's not very powerful, but can handle most day-to-day word processing tasks without difficulty. The best thing about it is the way it can be used in 'outline' mode. The outline shows the way in which frames inside a file are ordered — and ordering can mix all three major types of files, as well as graphs.

Perhaps more important from a word processing point of view, the outline allows you to break down what you're writing about into very specific subsections, so when you edit a certain section of a



document (or frame within a frame) you need only 'zoom in' on that frame from the outline mode in order to work on it.

Database: The Framework database is, not surprisingly, one of the best features of the package. Coming from the people who produced dBase II — arguably the world's best-selling database program for personal computers — you would expect something quite powerful. Framework's database isn't, of course, another dBase II. It's a simple and clearcut database that should fit most needs without the complex learning process required to learn and use dBase II properly. dBase II files are, however, compatible with Framework's database, making dBase complementary — rather than competitive.



In use

Framework is about as integrated as you would want a package to be — it's surpassed in this respect only by Lotus's Symphony. Because you can treat each frame as common-format data which can be moved anywhere inside a larger 'outline' framework, you have about as much integration as you might normally need. You cannot, however, do something like design a database form easily using the word processor on a 'words' form and then simply switch into a database, so the data formats of the package are not totally interchangeable.

Framework is a much easier-to-use product than most. Ashton-Tate has gone for a strong desktop metaphor with Framework — it lets you see boxes or frames representing the various pieces of work you're dealing with, and commands are virtually identical across the packages so it's easy to transfer skills learned in one to another.

Verdict

Framework beats everything else in the market except for Symphony, and in some cases it would be of more use than the Lotus product.

The outline system of organising frames makes multiple application work very easy and borders on full integration. The package is easy to use and the dBase II compatibility should mean that Ashton-Tate can carry a lot of their existing user base to Framework.

SYMPHONY

Symphony is a fully integrated package which follows the best-selling Lotus 1-2-3. The product is billed as an all-in-one business software system. In keeping with the trend it lets you switch easily from module to module, transfer data and even generate customised applications through a command generator.

Symphony will undoubtably become a frontrunner in the software charts because it offers the best integration of all the packages discussed here.

You need an IBM PC or compatible running PC DOS to use Symphony. This must be combined with 320K of RAM and two double-sided floppy drives or a hard disk. To get the most out of it, you'll also need a Hercules graphics or colour card. Other versions will be available soon for the Apricot, Rainbow, and IBM XT.

Spreadsheet: It's a giant — a full 256 columns by 8192 rows. It has facilities for keeping track of the dates of entries, indexing information and protecting or hiding specified cells. There is also a facility to generate levels of security to prevent illegal access.

Word processing: The word processor is competent. Lotus has identified that executives would prefer to trade off ease of use for learning in this particular sphere. Nevertheless, it features most of the things you need — word-wrap, copy, block move, search and replace. In addition, it has a nice range of print options (underlining, bold etc) and the ability to insert headers and footers with automatic page numbering.

Database: This is a forms-oriented system which, again, is designed for easy use. Lotus sees it being used to maintain simple lists of names, and addresses for invoices, mailing shots and so forth.

Graphics: This module offers seven types of graph which can be generated directly from the worksheet. Information is automatically revised in the graphics display when it's altered in the worksheet. It's very good and very well integrated.

Communications: The comms section provides a standard communications facil- 30▶

3 TIME-SAVERS

CACHE

MicroCache is a highly intelligent disk buffering system (cache) that dramatically boosts the performance of your microcomputer. It is totally transparent to the user, automatically monitoring your use of disks and quickly 'learning' what to hold in RAM. In this way disk accesses are very substantially reduced, saving you time and reducing frustration. **MicroCache** is available for most CP/M and MSDOS machines including IBM, Sirius, Apricot, DEC, NEC etc.

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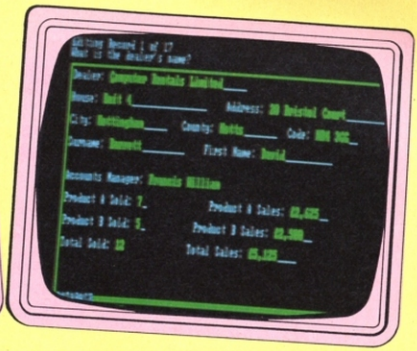

ity to capture data from mainframes with terminal emulation and the ability to use IBM 3270 protocols. Facilities exist for the integration of auto-dial modems.

In use

Symphony is RAM-based and therefore very quick — it requires so much memory because you load into RAM all the information to run all the modules within Symphony. There's no running off to the disk or hard disk every few minutes to load in more eode.

Transferring information between pack ages is simple because you only need make two keystrokes and the module changes. A change in the background surrounding data is the only difference between a paragraph of text in, for example, the word processor and the spreadsheet. Because of this, Symphony seems to display the best integration features of the packages re-viewed here.

Although the integration procedures are not supported by on-screen metaphors, a full windowing facility makes it easy to have several pieces of work 'out' at once and the nature of the data transfer makes integrating the information in those windows a doddle. This ease of use is even more remarkable when you consider the complete absence of icons, mice and the like. Symphony uses good, old fashioned command line techniques, but it uses them well. The menu and command options are much the same in all the modules.

Verdict

Symphony's system requirements are high, so you would expect to get a lot for the 320K minimum RAM necessary. With 512K and a Winchester the product really feels at its best. The windowing features are good and the prompts and procedures are nice. Symphony is probably the best bet among current packages for typical management applications.

SPECIFICATIONS

Name Appleworks **Price** £175 **Minimum system** Apple IIe, IIe+, IIc **Publisher** Apple Computer (UK), Eastman Way, Hemel Hempstead, Herts. HP2 7HQ. 0442 60244

Name Decision Manager **Price** £625 **Minimum system** IBM PC, 256k RAM **Publisher** Peachtree Software International, 99, King Street, Maidenhead, Berks. SL6 1YF. 0628 32711

Name Open Access **Price** £569.25 **Minimum system** IBM PC, 256k RAM **Publisher** Software Publishers International, (Distributed by Softsel Computer products 01 844 2040)

Name Framework **Price** £495 **Minimum system** IBM PC, 256k RAM **Publisher** Ashton Tate Cofferidge Close, Stony Stratford, Milton Keynes, MK11 1BY 0908 568866

Name Symphony **Price** £550 **Minimum system** IBM PC, 320k RAM (absolute minimum) **Publisher** Lotus Development (UK), Consort House, Victoria Street, Windsor, Berks. S14 1EX. 0753 840441

Conclusions

Integration is easier said than done. Certain trade-offs are necessary to do the job properly and one of the first things to be traded is low-cost computing. There's memory requirement for a start. Well integrated systems like Symphony require 320K minimum RAM with 512K working best. Even with this much RAM, the benefits of most packages only appear if you add a hard disk — after all, an integrated product disintegrates if you find you still have to swap disks just to get to different parts.

The other trade-off in integrated packages is lack of flexibility, you don't get to pick the individual applications you want.

If this compromise is too great there's the possibility of integrating via an environment like VisiOn, or MS Windows. This approach, however, can lose some of the much-touted integration advantages. One thing that's difficult to keep is commonality of commands. Although Windows, for instance, provides a series of on-screen metaphors so you have a consistent set of prompts and responses across the packages, this requirement means that the authors have to rewrite the software substantially. It remains to be seen whether this gambit will pay off.

There are further implications from integrated software. Once you have a large set of functions in a single body of software, a sophisticated command language can be incorporated so you can tailor the packages to meet your own needs.

A look into the future reveals a time (probably not too distant) when most personal computer users buy one of a handful of large, all-encompassing, sophisticated programs. These standard packages will incorporate all the common applications — word processing, spreadsheet, database, graphics and communications. Given time, you could construct command macros to tailor the package, or even use the language to generate entire applications.

Those who don't have the time or inclination might buy specific packages from a new level of software companies, sprouting up beneath the wings of the winners in the integrated programs stakes.

Products are likely to be designed to run under Symphony III or Framework II, or whatever emerges to take the prize and replace the present operating systems like MSDOS.

The operating systems people such as Microsoft and Digital Research are staking their futures on users who want to run individual application programs in an integrating environment. According to this philosophy, you will buy the individual packages — Wordstar, dBase II and so on — and use the environment software provided to allow them to run together, swap information and so on.

At the moment, it's anybody's game.

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H	Multimate	2
I	Supercalc	2
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K	Assembler Z80/8080	5
L	Assembler 8086	5
M	Basic	5
N	Advanced Basic	3
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John Lettice develops a taste for the classic Italian design of the Olivetti M24, another IBM competitor.

Obviously Olivetti

The styling comes as a shock at first, but it grows on you, to the extent where you start thinking of Olivetti's M24 as a sort of Ferrari against the IBM Ford. At this point, you collect up your marbles again, and recognise that you're suffering from softening of the brain. After all, Fords and Ferraris don't have the same engine. Of course, the two micros don't have exactly the same engine, as the IBM uses the 8088, while the M24 has an 8086-2. But the engines are functionally the same, albeit with some speed gains over the M24.

Nevertheless the M24 looks fast, and as IBM-compatibles become better and better at running IBM software, Italian styling might just be the edge required to sell into the well-dressed office environment.

Ignoring the demands of the Gucci hacker for the moment, the battleground in the PC compatible market seems to be part price and part flexibility. The degree of compatibility is an increasingly marginal consideration, as the likes of Compaq and Corona get even closer to the real thing. It's soon likely to be the case that if it isn't totally compatible it won't survive.

The Olivetti price is certainly competitive, and its flexibility leaves the IBM PC for dead. Something like half the space in the main console's insides can be given over to expansion slots and, unlike the real thing, the various bits and bobs you need to get it going — such minor items as printer interfaces and disk controllers — don't take up valuable slot space.

First impressions

The machine grows on you after the initial shock of discovering a PC compatible that isn't beigish-grey. The main unit is a neat box, and the works are tidied away to the extent that it has a considerably smaller footprint than the real PC. The keyboard can be IBM-compatible or the genuine Olivetti item, which separates the numeric keypad and cursor cluster, and is a lot easier to use.

The monitor — monochrome on the review model — is the standard Olivetti variety mounted on a ball and socket affair for tilt and swivel, giving it a Dalek aspect, similar to the M20's. The cables for this and the keyboard bolt onto the main console — in the case of the review machine this was the only way to achieve a proper connection between the two.

Despite the air of permanence this bolting gives the M24, the overall set-up is relatively light and mobile, though it's a moot point whether this would remain the case once you'd filled up the expansion slots.

Documentation

The M24 comes with three manuals — the MSDOS guide, GWBasic guide and the installations manual. The first two are standard, and will be familiar to anyone with experience of the IBM or of other PC-compatibles. The DOS guide is slightly out of the ordinary because it deals with hard disks in tandem with the basic floppy disk system, and this is an indication that Olivetti sees the machine as the centre of an expandable system as well as a stand-alone PC.

The installation manual continues this, giving sketchy details of a multitude of add-ons, including an expansion box. Why you'd want an expansion box when you've already got seven expansion slots is not clear, but Olivetti reckons this will be used for hard disk set-ups in the main. There's already one megameg project under way for a specialist customer and if this takes off we'll possibly see more of the same.

The installation manual that came with the review machine gave a distinct impression of being provisional, with gaps under several headings, but no doubt this will be fixed.

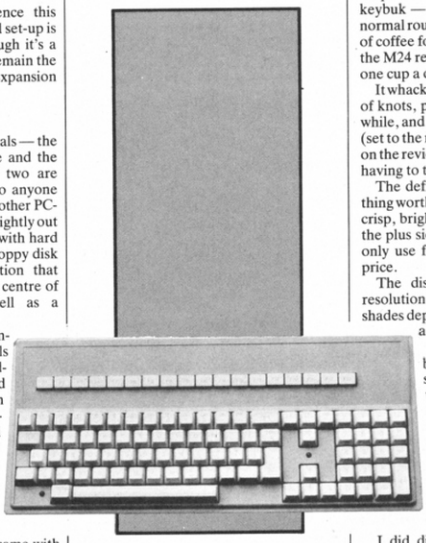
Construction

The main unit is an all-steel affair, with an air intake grille wrapped around the lower front edge, and a whopping great fan projecting out of the back. This keeps it cooler than the *PCN* PC at a similar cost *ie* the sound of a 747 powering up in the middle distance. Some people object to this, but I personally find the distant throb of aero engines rather comforting.

The drives are stacked vertically to the right of the main unit, but drive A is the bottom one, just to cause confusion. On the front of the case beneath the drives there's a power-on light and a reset button. Round the back, from left to right, there's power input, power output, Centronics and RS232, the plug space for the seven expansion slots, and then, parallel to the expansion slots, the monitor output. The latter also channels power to the monitor from the main unit, so you use one less plug. The bad news is the plug on the monitor is so bizarre you'll have trouble using it for other machines.

Opening up is just a matter of undoing two screws at the back and sliding off the cover. This reveals . . . nothing, in fact. The main board is mysteriously absent, as it is situated upside down underneath the machine. The main area of the case is given over to the expansion boards, and if you want to mess around with the main board you don't need to haul out all the cards you've put in first.

The M24 will take standard IBM



expansion cards, but has provision for Olivetti's own super-duper 16-bit bus cards, which will make the whole thing that much nippier. The display controller is tucked into the side, parallel to the expansion slots. The Bus Converter plugs into this, and has ten connectors altogether. Six of these are arranged in pairs, allowing the Olivetti boards to be plugged in, while the others take standard IBM boards.

With a quick flick of the wrist you flip the main console over — you need a pretty chunky wrist — undo a couple of screws, and you can get at the motherboard. This houses 8K ROM, expandable to 32K and 128K RAM, which can be jacked up to 256K by slotting chips in. In addition you can get a memory expansion board which plugs into the bus converter, and in its minimum configuration contains 128K. This can be jacked up to 384K, giving a grand total of 640K. The cpu itself (an Intel 8086-2) can directly address 1Mb of memory, but MSDOS can only handle 640K.

The entire meg must wait for Unix to be implemented on the machine. At this point the sums get a lot sillier, as Olivetti intends to start using 256K RAM chips as soon as they're widely available. It might be valuable to introduce a new factor to the PC-compatible contest, the crammability factor, with the IBM PC itself as the benchmark, and therefore rating 1 Cram — any takers to work it out?

Operation

Boot-up on the IBM PC is notoriously slow, and goes through agonies of introspection: switch on — pause — honk honk — pause — how am I this morning — keybuk — uh, what's the time then? My normal routine is to go and get myself a cup of coffee for the duration, so the arrival of the M24 reduced caffeine consumption by one cup a day.

It whacks through its diagnostics at a rate of knots, printing the result on screen the while, and as the clock is battery backed up (set to the right time straight out of the box on the review machine) there's none of this having to tell your micro what day it is.

The definition of the screen is another thing worth getting immoderate about. It's crisp, bright and rock-steady, and if this is the plus side of having a monitor you can only use for the M24 it's well worth the price.

The display supports 640×400 pixel resolution as standard, with 16 colours or shades depending on whether you're using a colour or monochrome display.

As you'd expect from a top-bracket PC-compatible, all the software I tried worked with no trouble. Obviously, the unfamiliar keyboard layout was a trifle confusing, but if you're using an M24 all the time you'll get used to it, and if you're chopping and changing between that and a PC you could simply get a PC-style keyboard for it.

I did discover one minor oddity that seems to be something to do with the ROM, but it's hardly likely to be something the typical user will be bothered with. Boot up the M24 with the Olivetti system disk, then try to load Basic, and the whole system hangs up. Drive A starts turning, and keeps turning — the only way out of it is to power down.

The same thing happens if you try to boot up with the IBM system disk. Now, the odd thing about this is that, though Basic is on the IBM disk, the M24 disk has GWBasic, so the machine should return 'file not found'. The IBM itself has a ROM Basic, so there might be some shred of the old PC ROM left in the Olivetti to make it think the file is in fact there, directory or no directory. I contacted Olivetti, and was told that it couldn't be duplicated on other machines, so it may be that I got a development ROM that slipped through somehow.

35►

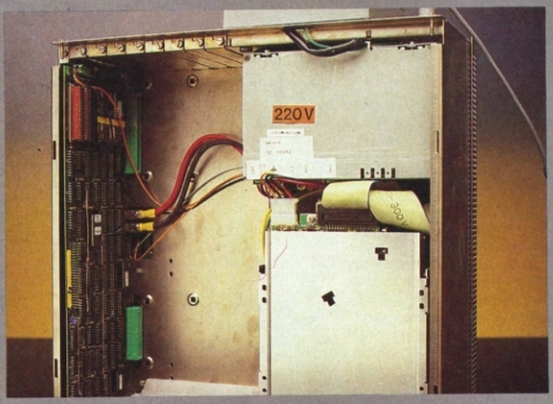
Expansion

◀33 The M24 seems well-provided for in terms of expansion. You can fit a Z8000 second processor to allow it to run software for Olivetti's earlier shot at the PC market, the M20, and there's space for fitting the 8087 numeric processor when it's available. The machine currently comes with twin 320K floppies, but 640K versions are on the way, and an 11Mb hard disk is already available. Microsoft Windows and Microsoft Word will also be catered for by an Olivetti mouse, which will plug directly into the keyboard.

In order to use most of the add-on cards you'll need to have the bus converter board installed. This is what provides the expansion slots, but it's possible to slot some cards directly into the display controller board without using the bus converter.

Students of advertising campaigns will have noted Olivetti is pushing communications heavily. In this area there will be 2780/3780 and 3270 comms boards, an IEEE488 interface and Ethernet and Omninet boards. Once this little lot is attached to it, modem man should find the M24 has a lot to offer, and could do sterling service within some sort of multi-machine net.

One of the Olivetti's peculiarities compared to other PC-compatibles is, therefore, the fact that it's much more of a complete range. Sure, it will still ride on the back of IBM software and peripherals to an extent, but the M24 will develop its own well-stocked range of peripherals, and the Olivetti dealer may turn out to be very much a separate entity from the IBM dealer.



The Olivetti has plenty of room inside for expansion. No heat problems with this machine

Up to seven expansion boards can be easily inserted at the rear of the machine

The drives are unusualy stacked one above the other. Each drive gives 320K of storage

Verdict

Progress in the micro industry is very much a two-edged sword. On the one hand there's always the next state of the art machine to look out for, while on the other it's a question of checking out various implementations of a tried and tested formula, of which the IBM PC affords a prime example.

In this sense Olivetti's current bid for stardom comes off very well. The machine's thoughtfully put together, so that it houses the maximum facilities in the minimum space, and though it's by no means the world's most sophisticated machine, there has to be a trade-off between sophistication and maintaining compatibility with what — when all is said and done — is a deeply unsophisticated machine that just happens to have taken over the world.

So the logical way to proceed is to produce something functionally identical that uses the faster 8086 cpu instead of the distinctly one-legged 8088. It should also have RS232, Centronics and colour display controller as standard, and should have bags of expansion slots, together with plenty of space on the main board for extra memory, should you want it. The M24 takes this logical approach, is competitively priced, and is also quite pretty. All in all, after something of a false start with the M20, it's a highly creditable effort.

And when it comes down to it, what exactly is state of the art? When you talk about a so-called 'leading edge' machine, all too often you're thinking about the machine as a package. Micro junkies will wander round for days after meeting one of these beasts babbling things like 'really neat' and 'nice piece of kit'. But it's arguable that state of the art has more to do with operating systems and processors than it has to do with pretty boxes and input/output.

So, at this point, we hit the paradox. The PC and its clones don't have 68000s running Unix, but they're very open machines, and if you want to do something (probably anything) esoteric with them it's just a matter of buying an add-on, or a package, that's either available now or will be very soon. Scarey, isn't it?

PCN

SPECIFICATIONS

Price	£2,230 for twin disk 128K system with monochrome display
Processor	8086-2 running at 8MHz
RAM	128K
ROM	16K bootstrap
Text screen	80×25
Graphics screen	640×400, 640×200, 320×200 or 512×256
Keyboard	IBM style with 83 keys or Olivetti version with 102 keys
Storage	Twin 320K 5.25in drives, 720K drives available shortly, 10Mb hard disk
Interfaces	Centronics, RS232 and mouse interface fitted as standard
O/S	MSDOS
Distributor	British Olivetti, 01-785 6666

SOFTWARE

• WHAT'S NEW • WHAT'S NEW • WHAT'S NEW •

Note to software publishers: If you wish your company's product to be included, please send only the very latest releases to *Bryan Skinner, Software Editor, PCN, 62 Oxford Street, London W1A 2HG;* and please don't forget to include prices and a telephone number.

GAMES

Automania, subtitled Manic Mechanic, uses the first Spectrum Quickloader. Micro-Gen has spent some time on it and other software houses are still working on their own versions. The game loads in under three minutes, and Micro-Gen claims it should load from most cassette decks. In this two-screen *Manic Miner* your task, as Wally Week, is to build ten cars. Each car needs six components, which must be collected from the store room. It's not that simple as various objects impede your progress, some of them fatally. Tricky stuff.

MFM has entered the card-game stakes with *Double Dealer*. This one's a two-sider, with seven-card stud poker and black jack. The poker's quite a good version: you play against the computer and your cards are shown in high-resolution graphics as they're dealt. However, the house limit of £100 per bet is a drawback.

Rapscallion, Bug-Byte's latest, is good but limited. You've been deposed as King of the Castle by Rapscallion. You endeavour to regain your crown and castle by tracing your way through a series of linked locations such as the lily pond and the dungeon. The graphics are limited but the number of screens and variation in the game are enough to sustain interest. There are at least a dozen screens in the wildnerness, before you even make the magic labyrinth or the castle itself. Mind you, to get out of the wildnerness you must collect various pieces of information from the crystals, or extra lives from the pixies as well as the magic eye, key and shield.

SOS is Vision's latest Spectrum offering and though it's a competent and difficult game it's essentially an arcade lunar lander, with meteors to avoid/shoot and stranded astronauts to rescue. Not easy, but dull.

Zeta 7, on the Commodore 64, has neat graphics, but is little more than a scrolling background, shoot-em up game. It's exasperating too: if alien fighters approach from the side, the gunsight's too slow to move to them before you're hit.

Now that Anirog's much-advertised *House of Usher* and others are finally here there's a sense of anticlimax, the more so because they're disappointing. *House of Usher* has a neat title screen, after which you find yourself in the haunted mansion, have to move to one of a number of doors and enter it, before finding yourself in a pretty standard levels game. *Ice Hunter* is reminiscent of *Space Planet/Burger Time*: you move across levels of ice, slide down ice columns, drop blocks of ice on the various monsters etc. It's rather slow and rather boring.

Still on the 64, Anirog has converted its Vic 20 game, *Bongo*, and Addictive Games has produced a translation of the excellent *Football Manager* — no-one should be without it. Going the other way, Anirog has ported two of its 64 programs to the Vic — *Minitron* and *Max*.

UTILITIES

ES Forth, the first British Forth for the Atari, includes a full screen editor (rather than Forth's standard, poor excuse for one), has predefined sprite handling, I/O extensions and costs only £14.95. There's a large manual but, as usual with Forth packages, at least half is taken up by a complete lising of the Fig Forth model and definitions. You'll certainly need an introductory text on Forth to get anywhere with this implementation. Though the package itself rates very highly, it's badly let down by signally inadequate documentation.

EDUCATIONAL

The Oric and Atmos haven't had much attention from educational software publishers; Mellowsoft remedies this at a low cost. The company's launch pack (a demo tape) costs just 50p, refundable against an order and contains 'stunning sound and graphics' as well as various screens from the range. Hard to believe, but true.

Can you Count?, for the four-to-six age range, presents one of three selectable scenes, ranging from town, country or seaside, and asks questions of the 'How many red cars can you see?' form. Each new scene shows different numbers of the many items, and indifferent colours so children can't just learn the numbers over a few practices. Some of the shapes are rather small, making it difficult to distinguish between them, and you'll need a good colour TV or a monitor.

Can You Spell? is superb. A large, very well drawn shape is shown which you must spell out. You select letters by moving an arrow underneath a lower case alphabet, then firing at the correct next letter. Little fingers may find the accuracy needed a little beyond them, but practice makes perfect.

If you hit the right letter it falls into a lorry which you drive under it. The lorry is returned to the factory and the letter processed. Suffice it to say that it's one of the best educational programs we've seen for a long time and just shows what imagination, talent and lots of hard work can produce. Well done Mellowsoft. PCN

ATARI

ES Forth	£14.95	English Software 061-835 1358

BBC

Galaxy Raiders	£8.95	Visions 01-748 7478

COMMODORE 64

Automania	£7.95	Micro-Gen 0344 427317
Zeta 7	£7.95	Mogul 01-734 6080
Football Manager	£7.95	Addictive Games 0202 296404
Ice Hunter	£6.95	Anirog 0322 92513/8
House of Usher	£6.95	Anirog 0322 92513/8
Petch	£6.95	Anirog 0322 92513/8
Bongo	£7.95	Anirog 0322 92513/8

ELECTRON

Pengi	£6.95	Visions 01-748 7478

ATMOS/ORIC

Launch Pack	£0.50	Mellowsoft, 23 Dalford Court, Hollinswood, Telford, Salop
Can You Spell?	£3.95	Mellowsoft, 23 Dalford Court, Hollinswood, Telford, Salop
Can You Count?	£3.95	Mellowsoft, 23 Dalford Court, Hollinswood, Telford, Salop

SPECTRUM

Automania	£6.95	Micro-Gen 0344 427317
SOS	£5.95	Visions 01-748 7478
Double Dealer	£6.50	MFM Software 0892 48832
Rapscallion	£6.95	Bug Byte 051-709 7071
Bongo	£5.50	Anirog 0322 92513/8

VIC 20

Maze Gold	£5.95	Visions 01-748 7478
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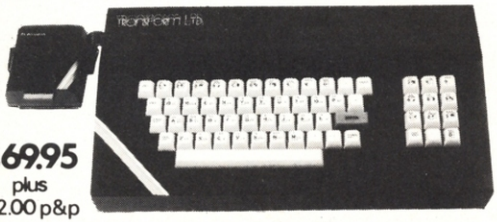

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Word Processing by Tasman **£13.90**
Tasword Two is a powerful word processing program that will perform all the functions available on large processors. The program will give you 64 characters per line on screen.

Masterfile by Campbell Systems **£15.00**
This is one of the best database programs available for the ZX Spectrum. This program has many uses in a small business.

Dlan by Campbell Systems **£7.95**
Use your Spectrum to sell your products. Dlan will display messages in up to 11 different typefaces. Will scroll text in any direction.

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NEW

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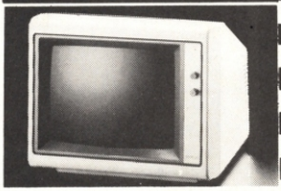

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Access

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41, Keats House, Porchester Mead, Beckenham, Kent.

BARCLAYCARD VISA

SPECTRUM

Sabre truths

Name Sabre Wulf **System** 48K Spectrum **Price** £9.95 **Publisher** Ultimate Play the Game, The Green, Ashby de la Zouch, Leicestershire LE6 5JU **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Mail order/Retail

With each new release we wonder if Ultimate can pull it off yet again — and each time the answer is yes, they can. Though it shares similarities with *Atic Atac*, *Sabre Wulf* is original and difficult enough to warrant a place in anyone's software collection.

Objectives

You're in charge of Sabre Man and must maneouvre him through the network of jungle paths and clearings to gather four pieces of a medallion. At least, I think that's the objective — the instructions are fulsome but unclear.

In play

Sabre Man is armed with, amazingly enough, a sabre, and you are armed with an Interface II, a Kempston or any cursor controlled interface, or a set of nimble fingers.

Why does he need a sabre? To protect him from the nasties that patrol the jungle paths, and a malicious, hilarious bunch of creatures they are, ranging from little lizards to parrots with punk hair-styles and charging rhinos. The bigger they are, the harder you fall. Not even your sabre can deal with a charging rhino or hippo, while the natives are also distinctly restless and apt to clobber you in a clearing. The maze seems enormous, and with much of it made up of narrow paths a great deal of running away as well as fighting has to go on.

Also scattered around are various trinkets and treasures, which add to your score, though they're really incidental to the main purpose of exploring the maze and finding the medallion. Planted around the place are several different-coloured orchids: yellow ones make you rather sick, purple ones make your movement controls work back-to-front for a time, while blue ones give you temporary protection against all the jungle creatures.

But it's the graphics that make this game a treat. The cartoon-like way the little man moves is a joy to watch, as is the way he's catapulted across the screen to land on the seat of his pants, and later flat on his back when the last of his five lives is gone. The sound, too, is impressive, and the sheer scale of the jungle map is a challenge to anyone — even after many plays I hadn't explored more than ten per cent of it. You're told what percentage you've scored at the endof each game.

Verdict

Once again, Ultimate Play the Game is definitely the name of the game.

Mike Gerrard

RATING (/5)

Lasting appeal	
Playability	
Use of machine	
Overall value	

Wolf at the door

Name It's the Wooluf! **System** Any Spectrum **Price** £6.50 **Publisher** Crystal Computing 061 205 6603 **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Retail/mail order

You must keep the wolf from the door literally in this low-key game.

Objectives

You soon discover that the eponymous wooluf is merely a wolf with a funny name. You are a hard-pressed shepherd herding your flock into a pen and keeping them well away from the jaws of the wolf.

In play

The keyboard controls a sheepdog which has ten sheep in its charge, and the action takes place on the one screen that you see, with the sheep starting off at bottom right of the farmland scene. You must get them across the one bridge over the river and up through the woods to the pen at top right.

The wolf patrols the top half of the screen in the main, moving between the various patches of woodland, though it does sometimes venture south.

The graphics of the game let it down rather badly, starting with the head of the wolf that appears at the start and every time a sheep gets nabbed. This is done in bulky block graphics and is most unrealistic.

The sheep look more like little white garden bugs, and they must be prize wool growers as you have to look very closely to see a head. They are also limited to two graphics characters, one facing left and one facing right, and they partly change colour should they venture too close to the river or trees.

The wolf is also very shimmery, which is a disappointment when you consider that the movements of the dog are well done, with it creeping along and crouching down, but the colour overlap is awful — sheep become dark if you put the wolf near them, as does the pen, and the sound too is minimal indeed: a tip-tap when the dog trots along and an unconvincing splash should one of the silly sheep fall in the river.

Another frustration is the lack of control. It's only really possible to take one sheep at a time, otherwise they run off all over the place, and even that one is hard to get going in the direction you want. There are no real instructions, and all you can do is try and vaguely chase the sheep generally in the right direction.

You score points for getting sheep in the pen, but once in, they later return to the start so the game continues till all the sheep have either drowned or been eaten.

The game then ends with a bald statement of your score and high score, and off you go to play again, should you have nothing more exciting to do.

Verdict

A great disappointment from Crystal: counting sheep is, after all, a celebrated method for getting to sleep.

Mike Gerrard

RATING (/5)

Lasting appeal	
Playability	
Use of machine	
Overall value	

A new batch of games for your Commodore 64's edification . . . uncanned by Bob Chappell.

64 varieties of skill

BEACH-HEAD

Voted the best game for sound and graphics by US music magazine *Billboard*, Beach-Head is an all-action war simulation. You don't have to worry about tactical movements of troops and supplies — this is a pure arcade-style shoot-em-down game.

The game has several stages. The first, which is optional, has you manoeuvring your graphically-simple fleet through a passage. Or you can get straight into the real action on stage two — a defence against a seemingly quite inexhaustible squadron of aircraft.

In the foreground are the twin-barrels of your anti-aircraft gun which you train on approaching planes. When fired, the gun recoils impressively. The enemy planes come at you from an aircraft carrier, anchored just out of range. The planes appear in detailed silhouette, swooping toward your position in a most realistic fashion.

The throb and whine of their engines, together with the thud of your gun, could almost be the real thing.

Survive this onslaught and the action shifts to another scene, where the enemy is lobbing shells your way. The scream of a shell and, if you're lucky, its splash and explosion nearby is enough to make your hair curl.

Later combat includes a grand tank battle.

Stunning sound effects coupled with excellent graphics, make this one of the best games to be released for the Commodore 64.

BLACK HAWK

More action on the battlefront but this time you are up in the air. Flying Black Hawk, the world's deadliest fighter plane, you advance deep into enemy territory, knocking out tanks, anti-aircraft guns, helicopter gunships, rockets and heat-seeking missiles on your way to the enemy airfield.

Two screens are used, one for attack mode, the other for defence. The game automatically switches into the appropriate screen, depending on what hostiles are coming for you.

In the attack mode, your aerial position provides a panoramic view of the terrain — fields, railway lines, power cables, barbed wire fences, trees etc. An indicator at the bottom of the screen shows the source point of your guided missile sight. Holding down the fire button and moving the joystick causes a cross-hair to move out. Releasing the button sends the missile on its course to the sight.

Defence mode is more the traditional shoot-up. You move your plane left and right while firing your cannons at approaching enemy craft.

The game has over 30 levels of play and always sets you off on a mission with a stirring snatch of *The Ride of The Valkyries*. The scrolling graphics are clean and smooth, and sound is used effectively. Recommended.

PEGASIS

From combat in the modern age to the days of yore when horse power was literally just that. Pegasis (*sic*) sets you straight down in mythology for a battle between winged steeds.

The fight takes place against a Greek-myth backcloth, all temples and clouds. Pegasis, your white and winged horse, starts at the bottom of the screen.

With a whirring and flapping, and like Hell's Angels looking for trouble, Black Warriors astride flying black horses cruise the sky. Pegasis can topple a warrior only by swooping down on him; any other contact is fatal. Once a warrior hits the deck, Pegasis must stomp on him, or the beast will remount and cause trouble again.

Taking Pegasis for a spin requires a little practice and a fair amount of skill — thrust, direction, gliding and landing, all must be accomplished with reasonable precision.

An original and addictive game which, though lacking in variety, does provide a searching test of your aerobatic skills. Loved the graphics, especially those flapping wings.

OMEGA RUN

Back to the present day but staying in the air: your mission this time is to wipe out a doomsday machine.

Most of the screen is the view from the cockpit of your fighter-bomber, with an instrument panel at the bottom.

Your target is a silo which houses the doomsday machine. Since the distance you must fly is beyond your fuel capacity, part of the mission involves an airborne rendevous with a tanker.

What you see is mostly sky and land but the journey is far from uneventful; enemy defences include fighter planes, anti-aircraft fire and ground to air missiles. When one of these is in range, a cross-sight appears and you can pot away. You also have bombs on board — once you've dropped them, the game's over, mission accomplished or not.

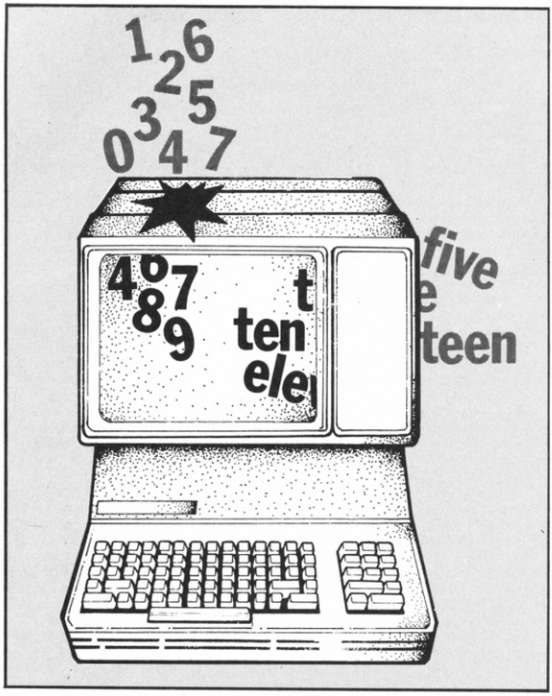
You can play the game on several levels or even set up your own. The customise option lets you decide distance to target, number of bombs, vulnerability, etc — an admirable feature.

The graphics are fairly simple, though the instrument panel is a joy to behold — crystal clear detail and beautifully set out. The impression of movement and speed given by the scrolling view is very good.

Altogether, a first rate flight-cum-air-battle simulation, and excellent entertainment. PCN

Beach-head (tape £9.95, disk £14.95) Access Software, USA, obtainable from Centresoft, West Midlands 021-520 7591.
Black Hawk Tape £7.95) ThornEMI, Farnborough 0252 543333.
Pegasis (tape £8.95, disk £12.95) Audiogenic, 0734 586334.
Omega Run (tape £6.95) CRL, London 01-533 2918.

DISASSEM



Title: *Disassem*
Machine: *Dragon 32*
Language: *Microsoft Basic*
Application: *Utility*
Author: *Adrian C Morgan*

Disassemblers for the 6809 processor are rather thin on the ground, but here is one for the Dragon 32 written by Adrian Morgan.

When run, the program will prompt you for the start and end addresses of the section you want to look at in memory. These must be input in hex. You then have the option of having the hex values of the code listed with the mnemonic, or just having the mnemonics. You are also given the choice of a screen or printer output; this is done by pressing S or P respectively.

If you choose the screen option you can browse through the list or scroll it by pressing B or S. Choosing the browse option means that you can restart at any time by pressing E. The screen option is quite fast as POKE &HFFD7,1 is used in line 100 to speed up the process.

The disassembler can be used to root through the Dragon's ROM to see how it actually works, or it can be used to dissasemble code that you have already written.

The next program required is a 6809 assembler. Any offers?

Program notes

10	Reserves memory for machine code and sets the Basic limit
20	Reads disassembly data
30-40	Input start address in Hex
50	Inputs end address in Hex
60	Converts start and end addresses to decimal
70-80	Request for code listing
90-110	Input to screen or printer?
120-130	Request for browse option when the screen is selected for output
150	Mains control loop
160-190	Secondary loop including data type separation to call relevant instruction subroutine
200-210	Pause subroutine for browse option

```
10 CLEAR800:CLS:DIM A$(255),B(25
5),J$(4)
20 FORI=0TO255:READA$(I),B(I):NE
XTI:SOUND200,1:SOUND100,1
30 PRINT@9,"DIS-ASSEMBLER";:PRIN
T@100,"INPUT START ADDRESS ";
40 INPUTSA$:IFLEN(SA$)>4THEN30
50 PRINT@196,"INPUT END ADDRESS
  ";:INPUTEA$:IFLEN(EA$)>4THEN50
60 SA=VAL("&H"+SA$):EA=VAL("&H"+
EA$):IFSA>EA THEN30
70 PRINT@292,"DO YOU NEED CODE L
ISTING";
80 D$=INKEY$:IFD$="Y"THENEE=1ELS
EIFD$="N"THENEE=0ELSE80
90 PRINT@356,"OUTPUT TO SCREEN/P
RINTER";
100 D$=INKEY$:IFD$="P"THENPR=-2E
LSEIFD$="S"THENPR=0:GOTO110:POKE
&HFFD7,1ELSE100
110 IFPR=-2THENC$="S":GOTO140
120 PRINT@420,"BROWSE OR SCROLL
OUTPUT";
130 C$=INKEY$:IFC$="B"ORC$="S"TH
EN140ELSE130
140 I=SA:SOUND200,2:CLS:AX=0
150 GOSUB160:IFI>EA OR(I<EA AND
AX=1)THENPOKE&HFFD6,0:C$="B":GOS
UB200:GOTO30ELSE150
160 V=PEEK(I):F=INT(B(V)/10):G=B
(V)-F*10:I$=HEX$(I):M$=A$(V):J$(
0)=HEX$(V)
170 ONF GOSUB590,550,600,450,580
,720,880,930
180 IF(EE=1ANDZ=10)OR(EE=0ANDZ=1
5)THENGOSUB200
190 GOSUB220:RETURN
200 Z=0:IFC$="S"THENRETURN
210 D$=INKEY$:IFD$=""THEN210ELSE
IFD$="E"THENRUNELSECLS:RETURN
```

220-280	Output and formatting routine
290-440	Data statements
450-480	Relative branch handling subroutine
490	Peeks 1 subroutine for 8 bit memory
500	Peeks 2 subroutine, used after peek 1 for a 16 bit value from memory
510	8 bit 2's complement handling subroutine
520	8 bit 2 character string handling subroutine
530	16 bit 2's complement handling subroutine
540	16 bit 4 character string handling subroutine
550-570	Immediate instruction subroutine
580	Extended instruction subroutine
590	Direct instruction subroutine
600-710	Inherent instruction subroutine
720-870	Indexed instruction subroutine
880-920	Page 2 instruction subroutine
930-950	Page 3 instruction subroutine
960	Memory location pointer increment and check for wrap round condition subroutine

PCN

```
220 IFLEN(I$)<4THENI$="0"+I$:GOT
0220
230 FORJ=0TO4:IFLEN(J$(J))<2THEN
J$(J)="0"+J$(J):NEXTJ ELSENEXTJ
240 K$="":FORJ=0TO4:K$=K$+J$(J):
NEXTJ:K$=LEFT$(K$,(D+G)*2)
250 IFLEN(K$)<10THENK$=K$+" ":GO
TO250ELSEL$=I$+" "
260 IFEE=1THENL$=L$+K$+" "
270 L$=L$+M$+" "+N$+O$+P$:PRINT£
PR,L$;M$="":L$="":K$="":K=0:GOSU
B960:K1=0:D=0
280 FORJ=0TO4:J$(J)="":NEXTJ:N$=
"":O$="":P$="":Z=Z+1:RETURN
290 DATA NEG  ,12,ERR  ,31,ERR
,31,COM  ,12,LSR  ,12,ERR  ,31,R
OR  ,12,ASR  ,12,ASL  ,12,ROL
12,DEC  ,12,ERR  ,31,INC  ,12,TS
T  ,12,JMP  ,12,CLR,12
300 DATA ,72,,82,NOP  ,31,SYNC ,
31,ERR  ,31,ERR  ,31,BRA  ,43,BS
R  ,43,ERR  ,31,DAA  ,31,ORCC ,2
2,ERR  ,31,ANDCC,33,SEX  ,31,EXG
  ,32,TFR  ,32
310 DATA BRA  ,42,BRN  ,42,BHI
,42,BLS  ,42,BCC  ,42,BCS  ,42,B
NI  ,42,BEQ  ,42,BVC  ,42,BVS
42,BPL  ,42,BMI  ,42,BGE  ,42,BL
T  ,42,BGT  ,42,BLE  ,42
320 DATA LEAX ,62,LEAY ,62,LEAS
,62,LEAU ,62,PSHS ,32,PULS ,32,P
SHU ,32,PULU ,32,ERR  ,31,RTS,31
,ABX  ,31,RTI,31,CWAI ,32,MUL
31,ERR,31,SWI 1,31
330 DATA NEGA ,31,ERR  ,31,ERR
,31,COMA ,31,LSRA ,31,ERR  ,31,R
ORA ,31,ASRA ,31,LSRA ,31,ROLA ,
31,DECA ,31,ERR,31,INCA ,31,TSTA
  ,31,ERR,31,CLRA ,31
340 DATA NEGB ,31,ERR  ,31,ERR
,31,COMB ,31,LSRB ,31,ERR  ,31,R
ORB ,31,ASRB ,31,LSLB ,31,ROLB ,
31,DECB ,31,ERR,31,INCB ,31,TSTB
  ,31,ERR,31,CLRB ,31
350 DATA NEG  ,62,ERR  ,31,ERR
,31,COM  ,62,LSR  ,62,ERR  ,31,R
OR  ,62,ASR  ,62,LSL  ,62,ROL
62,DEC  ,62,ERR,31,INC  ,62,TST
  ,62,JMP  ,62,CLR  ,62
360 DATA NEG  ,53,ERR  ,31,ERR
,31,COM  ,53,LSR  ,53,ERR  ,31,R
OR  ,53,ASR  ,53,LSL  ,53,ROL  ,
53,DEC  ,53,ERR,31,INC  ,53,TST
  ,53,JMP  ,53,CLR  ,53
370 DATA SUBA ,22,CMPA ,22,SBCA
,22,SUBD ,23,ANDA ,22,BITA ,22,L
DA  ,22,ERR  ,31,EORA ,22,ADCA ,
22,ORA  ,22,ADDA ,22,CMPX ,23,BS
R  ,42,LDX  ,23,ERR,31
380 DATA SUBA ,12,CMPA ,12,SBCA
,12,SUBD ,12,ANDA ,12,BITA ,12,L
DA  ,12,STA  ,12,EORA ,12,ADCA ,
12,ORA  ,12,ADDA ,12,CMPX ,12,JS
R  ,12,LDX  ,12,STX  ,12
390 DATA SUBA ,62,CMPA ,62,SBCA
,62,SUBD ,62,ANDA ,62,BITA ,62,L
DA  ,62,STA  ,62,EORA ,62,ADCA ,
62,ORA  ,62,ADDA ,62,CMPX ,62,JS
R  ,62,LDX  ,62,STX  ,62
400 DATA SUBA ,53,CMPA ,53,SBCA
,53,SUBD ,53,ANDA ,53,BITA ,52,LD
A  ,53,STA  ,53,EORA ,53,ADCA ,5
3,ORA  ,53,ADDA ,53,CMPX ,53,JSR
  ,53,LDX  ,53,STX  ,53
410 DATA SUBB ,22,CMPB ,22,SBCB
,22,ADDD ,23,ANDB ,22,BITB ,22,L
DB  ,22,ERR  ,31,EORB ,22,ADCB ,
22,ORB  ,22,ADDB ,22,LDD  ,23,ER
R,31,LDU  ,23,ERR,31
420 DATA SUBB ,12,CMPB ,12,SBCB
,12,ADDD ,12,ANDB ,12,BITB ,12,L
DB  ,12,STB  ,12,EORB ,12,ADCB ,
12,ORB  ,12,ADDB ,12,LDD  ,12,ST
D  ,12,LDU  ,12,STU  ,12
430 DATA SUBB ,62,CMPB ,62,SBCB
,62,ADDD ,62,ANDB ,62,BITB ,62,L
DB  ,62,STB  ,62,EORB ,62,ADCB ,
62,ORB  ,62,ADDB ,62,LDD  ,62,ST
D  ,62,LDU  ,62,STU  ,62
440 DATA SUBB ,53,CMPB ,53,SBCB
,53,ADDD ,53,ANDB ,53,BITB ,53,L
DB  ,53,STB  ,53,EORB ,53,ADCB ,
53,ORB  ,53,ADDB ,53,LDD  ,53,ST
D  ,53,LDU  ,53,STU  ,53
450 GOSUB490:IFG=2THENV4=VI:GOSU
B510:GOTO470
460 GOSUB500:GOSUB530:M$="L"+M$
470 O$=O$+"  ":P=I+1+V4:O$="":IFP
>&HFFFF THENP=P-65536ELSEIFP<0TH
ENP=P+65536
480 O$=HEX$(P):GOSUB540:P$="("+O
$+")":O$="":RETURN
490 GOSUB960:VI=PEEK(I):J$(1+K+K
1)=HEX$(VI):RETURN
500 GOSUB960:V2=PEEK(I):J$(2+K+K
1)=HEX$(V2):V4=VI*256+V2:RETURN
510 IFV4>&H7F THENN$="-"+V4=256
-V4:O$=HEX$(V4):V4=-V4 ELSEN$="+
$":O$=HEX$(V4)
520 IFLEN(O$)<2THENO$="0"+O$:RET
URNELSERETURN
530 IFV4>&H7FFF THENN$="-"+V4=6
5536-V4:O$=HEX$(V4):V4=-V4 ELSEN
$="+$":O$=HEX$(V4)
540 IFLEN(O$)<4THENO$="0"+O$:GOT
O540ELSERETURN
550 GOSUB490:IFG=2THENO$=HEX$(VI
):GOSUB520:GOTO570
560 GOSUB500:O$=HEX$(V4):GOSUB54
0
570 N$="£$":O$=O$:O$="":RETURN
580 GOSUB490:GOSUB500:O$=HEX$(V4
):GOSUB540:O$=O$:N$="$":O$="":RE
TURN
590 GOSUB490:O$=HEX$(VI):GOSUB52
0:N$="$":O$=O$:O$="":RETURN
600 IFG=1THENRETURNELSEGOSUB490:
IFV>31THEN660ELSEA=(VI AND&HF0)/
16:B=VI AND15:K=1
610 IFA<5THENO$=MID$("DXYUS",A+1
,1):GOTO630
620 IFA=5THEND$="PC"ELSEIFA=8THE
NO$="A"ELSEIFA=9THEND$="B"ELSEIF
A=10THEND$="CCR"ELSEIFA=11THENO$
="DPR"ELSEO$="ERR"
630 IFK=0THENN$=N$+O$:O$="":RETU
RNELSEN$=O$:O$="":A=B:K=0
640 IFV=30THENN$=N$+"<)"ELSEIFV=
31THENN$=N$+"->"ELSEN$=N$+"?"
650 GOTO610
660 IFV>&H37 THEN690ELSEO$="":K=
1
670 IF(VI AND K)=K THENO$="1"+O$
 ELSEO$="0"+O$
680 IFK<128THENK=K*2:GOTO670ELSE
N$=O$:O$="":RETURN
690 VA=(VI AND255):IFVA=255THENO
$="DIS BOTH":GOTO710ELSEIFVA=&HE
F THENO$="EN IRQ":GOTO710
700 IFVA=&HBF THENO$="EN FIRQ"EL
SEIFVA=&HAF THENO$="EN BOTH"ELSE
O$="INT ERR"
710 RETURN
720 GOSUB490:GOSUB750:IF(VI AND
&H80)=&H80 THEN760
730 V2=VI AND31:IFV2>15THENN$="-
":V2=32-V2ELSEN$="+"
740 O$=HEX$(V2):GOSUB520:N$="$"+
N$+O$+",":+S$:RETURN
750 V2=(VI AND &H60)/32:S$=MID$(
"XYUS",V2+1,1):RETURN
760 IF(VI AND16)=16THENO$="[":P$
="]"ELSEO$="":P$=""
770 V2=VI AND15:IFV2=0THENN$="+"
ELSEIFV2=1THENN$=O$+"++"ELSEIFV2
=2THENN$="-"ELSEIFV2=3THENN$=O$+
"--"
780 IFV2>3ANDV2<7THENN$=O$+MID$(
"0BA",V2-3,1):N$=N$+",":+S$:RETUR
N
790 IFV2=11THENN$=O$+"D,":+S$:RET
URNELSEIFV2<4THENN$=",":+S$+N$:RE
TURN
800 K1=1:R$=O$:GOSUB490:IFV2=80R
V2=12THEN840ELSEIFV2=15THEN820EL
SEIFV2=90RV2=13THEN860
810 N$="ERR":P$="":RETURN
820 GOSUB500:O$=HEX$(V4):N$=R$:G
OSUB540:IFP$<>")"THENN$="ERR"
830 O$=O$:O$="":RETURN
840 G=G+1:V4=VI:GOSUB510:IFV2=12
THENS$="PC"
850 GOTO870
860 G=G+2:GOSUB500:GOSUB530:IFV=
13THENS$="PC"
870 N$=R$+N$:O$=O$+",+S$:R$="":
S$="":RETURN
880 GOSUB490:K=1:M$=A$(VI):IFVI=
&H3F THENM$="SWI 2":RETURN
890 D=1:IFVI<&H30 ANDVI>&H21 THE
NG=G+1:GOTO450
900 X=VI AND15:X1=(VI AND&HF0)/1
6:IFX=3THENM$="CMPD ":GOTO920ELS
EIFX=12THENM$="CMPY ":GOTO920ELS
EIFX=14ANDX1<12THENM$="LDY  ":GO
TO920
910 IFX=15ANDX1<>8ANDX1<12THENM$
="STY  "ELSEIFX1>11ANDX=14THENM$
="LDS  "ELSEIFX1>12ANDX=15THENM$
="STS  "ELSEM$="ERR":RETURN
920 IFX1=9ORX1=13THEN590ELSEIFX1
=10ORX1=14THEN720ELSEG=3:IFX1=80
RX1=12THEN550ELSEIFX1=11ORX1=15T
HEN580ELSEM$="ERR":RETURN
930 GOSUB490:D=1:K=1:IFVI=&H3F T
HENM$="SWI 3":RETURNELSEG=3:X=VI
 AND15:X1=(VI AND&HF0)/16
940 IFX=3THENM$="CMPU "ELSEIFX=1
2THENM$="CMPS "ELSEM$="ERR":RETU
RN
950 IFX1=8THEN550ELSEIFX1=9THEN5
90ELSED=2:IFX1=10THEN720ELSEIFX1
=11THEN580ELSEM$="ERR":RETURN
960 I=I+1:IFI>65535THENI=0:AX=1:
RETURNELSERETURN
```

PCN PROGRAMS: DRAGON 32

PCN PROGRAMS: VIC 20

Gothic And GREEK

K Hewson of Maghull in Merseyside has written a program that will take your micro back to the middle ages by creating a character set for the unexpanded Vic 20 in the Gothic style. He has also redefined the character set into the Greek alphabet for any aspiring philosophers.

When the program is run 'Please wait' will appear on the screen while the characters are redefined. Then the words on the screen will take on their new design. Typing RUN STOP RESTORE will return the Vic to the normal character set and typing POKE 36809,255 will bring back the Gothic or Green letters.

The letters could be of particular use in adventure games where they can look very effective and set the mood perfectly.

Title: *Gothic and Greek*
Machine: *Vic 20*
Language: *Commodore Basic*
Application: *Utility*
Author: *K Hewson*

Program notes

20	Reserves space in memory to prevent corruption of characters
30-40	Copy the characters from ROM into RAM
50-60	Read character data and poke in values for defined characters
65	Checks to see that the data has been typed in correctly
70	Puts computer in user defined character mode
1000-1250	Data for characters

```
10 PRINT"□PLEASE WAIT"
20 POKE51,255:POKE52,27:POKE55,
   255:POKE56,27
30 FORI=0TO511
40 POKE7168+I,PEEK(32768+I):NEXT
50 FORI=0TO(26*8-1):READA:T=T+A
60 POKE7168+I+(1*8),A:NEXT
65 IFT<>11394THENPRINT"DATA ERROR
     - PLEASE   CHECK":STOP
70 PRINT"□":POKE36869,255
1000 DATA64,184,36,36,60,36,37,66
1010 DATA104,52,36,40,36,36,188,64
1020 DATA12,178,80,16,16,16,18,12
1030 DATA112,136,84,20,20,20,42,48
1040 DATA36,90,16,28,16,18,28,32
1050 DATA72,180,32,56,32,32,160,96
1060 DATA12,178,80,16,22,18,18,12
1070 DATA64,64,36,36,60,36,165,66
1080 DATA16,42,12,8,8,8,42,20
1090 DATA16,42,12,8,8,40,72,48
1100 DATA72,164,40,48,40,36,164,64
1110 DATA64,160,32,32,32,36,34,60
1120 DATA84,170,42,42,34,34,42,68
1130 DATA68,178,50,42,42,38,38,66
1140 DATA88,164,36,36,36,36,36,24
1150 DATA88,164,36,36,56,32,32,64
1160 DATA88,164,36,36,32,44,37,26
1170 DATA88,164,36,40,52,36,37,66
1180 DATA88,164,32,24,4,68,36,24
1190 DATA16,42,12,8,8,8,8,16
1200 DATA72,168,40,40,40,42,42,20
1210 DATA68,170,42,40,40,40,40,16
1220 DATA64,162,34,34,42,42,42,21
1230 DATA66,162,36,24,24,36,37,66
1240 DATA64,68,42,16,16,32,160,64
1250 DATA36,88,8,16,16,32,74,116
```

```
10 PRINT"□PLEASE WAIT"
20 POKE51,255:POKE52,27:POKE55,
255:POKE56,27
30 FORI=0TO511
40 POKE7168+I,PEEK(32768+I):NEXT
50 FORI=0TO(26*8-1):READA:T=T+A
60 POKE7168+I+(1*8),A:NEXT
65 IFT<>8740THEN"DATA ERROR
     - PLEASE   CHECK":STOP
70 PRINT"□":POKE36869,255
1000 DATA24,24,36,60,102,66,66,0
1010 DATA124,34,34,60,34,34,124,0
1020 DATA126,34,34,32,32,32,112,0
1030 DATA24,24,36,36,102,66,126,0
1040 DATA126,34,32,56,32,34,126,0
1050 DATA126,70,12,24,48,98,126,0
1060 DATA102,36,36,60,36,36,102,0
1070 DATA24,36,66,126,66,36,24,0
1080 DATA28,8,8,8,8,8,28,0
1090 DATA102,36,40,48,40,36,102,0
1100 DATA24,24,60,36,36,102,102,0
1110 DATA66,102,90,66,66,66,66,0
1120 DATA66,98,82,74,70,66,60,0
1130 DATA126,0,36,60,36,0,126,0
1140 DATA24,36,66,66,66,36,24,0
1150 DATA126,36,36,36,36,36,36,0
1160 DATA124,34,34,60,32,32,112,0
1170 DATA126,98,48,24,48,98,126,0
1180 DATA62,42,8,8,8,8,28,0
1190 DATA20,42,8,8,8,8,28,0
1200 DATA8,28,42,42,28,8,8,0
1210 DATA102,66,36,24,36,66,102,0
1220 DATA42,42,42,28,8,8,28,0
1230 DATA0,24,36,66,66,36,102,0
1240 DATA0,0,0,0,0,0,0,0
1250 DATA0,0,0,0,0,0,0,0
```

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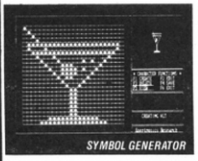
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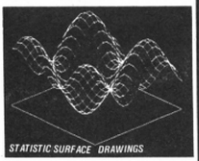
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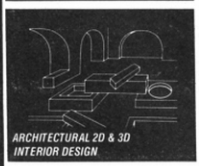
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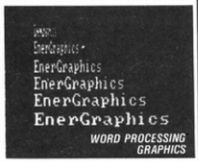

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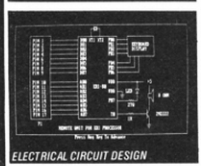
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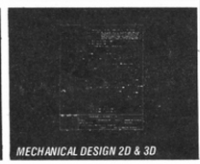
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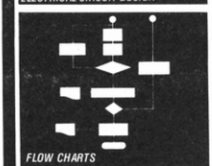
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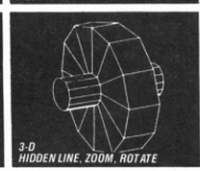
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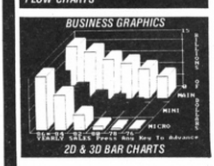

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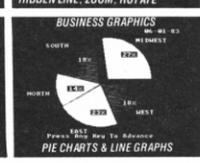

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Is Tandy using a random number generator to produce certain vital figures in its catalogue? Either that, or its expansion packs aren't preshrunk. Above, for example, is what the 64k RAM Upgrade Kit does for you.

Thanks to Simon Williams for this winning submission to the *PCN* Misprints and Gibberish Contest. £5 is on its way.

Come in QL, your time's up

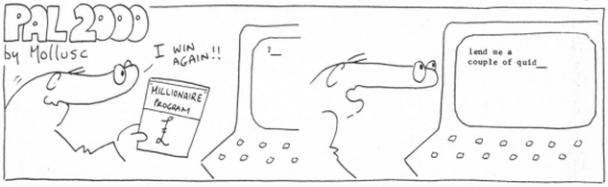
Shortage? What shortage? Sinclair now claims that the QL backlog is under control. Speaking about the long black beast that promises to do for micros what Ted Nugent did for Guitar playing, a Sinclair operative — for obvious reasons we've allowed him to tick the no publicity box — last week referred to it as 'the unit we're shipping today and have been shipping to mail order customers for some time . . . '

The unit? So there you have it, the reason there's a perceived shortage of QLs is that there is in fact only one of them, and they're — sorry, it is — just being recycled. In light of this, we feel bound to make a special announcement, for the attention of Eric Sproggins of Acacia Avenue, Batley. You've already had the unit for a week now, so will you please get your finger out and send it back. There are 14,999 other people out there waiting for it, you know . . .

Rich picking?

Thieves struck at dead of night a couple of weeks ago at the palatial north London residence of former *PCN* deputy editor Geof Wheelwright. Rather than attempting to make off with the burly Wheelwright, on the grounds that nobody would have paid the ransom, they took a TV, a video recorder, and a Compaq portable.

Geof reports that they also picked up a QL, but thought better of it and put it back again.



SYNTAX ERRORS

In the software pre-view in issue 70 we said that Paranoid Pete for the BBC was published by VBIK. The publisher is actually called UBIK.

To forestall numerous enquiries, the Valiant turtle in issue 71 does not, unfortunately, come with a BBC micro, as stated.

NEXT WEEK

Amstrad trad — *we check out Amstrad's Basic against the dialect spoken by the BBC micro.*

Toffee Apple — *can the portable IIc lick its rivals? Find out in this full Pro-Test.*

Oric saver — *use your micro to keep tabs on domestic bills.*

Alpha mega — *we test run the Alpha 10 hard disk subsystem for the IBM PC.*

Charttoppers — *after near-letter-quality printers, it's negr-personalised-graphics as we review the Chartpack package for the Commodore 64.*

Dragon port — *support for the Dragon continues with this add-on user port.*

Gameplay — *scan the latest Spectrum and BBC games in our reviews.*

Programs — *generate the patter of tiny feet on your Spectrum with our listing of a scrolling Millipede game.*

PCN DATELINES

PCN Datelines keeps you in touch with up-coming events. Make sure you enter them in your diary.

Organisers who would like details of coming events included in PCN Datelines should send the information at least one month before the event. Write to PCN Datelines, Personal Computer News, 62 Oxford Street, London W1A 2HG.

UK EVENTS

Event	Dates	Venue	Organisers
Advanced Technology	August 9-13	St George's Hall, Liverpool	Advanced Technology, 051-236 0121
Acorn User Exhibition	August 16-19	Olympia, London	Computer Marketplace Exhibitions 01-930 1612
Electron & BBC Micro User Show	August 31-Sep 2	UMIST, Manchester	Database Publications, 061-456 8383
IBM System User Show	Sept 3-5	Olympia	EMAP International Exhibitions 01-837 3699
Hampshire Computer Fair	Sept 6-7	Guildhall, Southampton	Testwood Exhibitions, 0703-31557
PCW Show	Sept 19-23	Olympia	Montbuild 01-486 1951
Computer Communication & Control	Sept 26-28	Brighton Centre	Institution of Electrical Engineers 01-240 1871
Computer Graphics FX Exhibitions	October 9-11	Wembley, London	Online Conferences Ltd 01-868 4466
Electron & BBC Micro User Show	October 25-28	Alexandra Palace, London	Database Publications 061-456 8383
Computers in Action	October 30-Nov 1	Anderson Centre, Glasgow	Trade Exhibitions, 0764 4204

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
SE Asia Regional Computer Conference	Sept 24-27	Hong Kong	Industrial & Trade Fairs International, 021-705 6707
Computer Exhibition — Comdex/Europe	October 29-Nov 1	Amsterdam, Holland	Interface Group Inc, Amsteldijk 166, 1079 LH Amsterdam

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